# Seven Hills Mine HGM - Response to EPA Comments

To: Mr. Bryce West, Peabody Energy

From: Rick Larsen, Eco-Tech Consultants, Inc.

Subject: **2017 Hydrogeomorphic Assessment of the Seven Hills Mine Update**
Warrick County, Indiana
Eco-Tech Consultants Project LV2017009

Date: May 16, 2017

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In response to comments presented by the EPA regarding the Hydrogeomorphic Assessment (HGM) conducted at the proposed Seven Hills Surface Mine site, Eco-Tech offers the following points for clarification:

## 1. Weighted Functional Capacity Indices

FCIs should be weighted by area and cover types should be segregated into partial wetland assessment areas.

As the HGM is a measure of functional quality over a representative area, giving it equal weight to each plot separate of the relative acreage it represents of the site, under-represents the condition of the forested areas onsite. Since the WKY Guidebook uses a mature forest as the reference standard condition, areas of herbaceous and shrub cover will show decreases in vegetative subindices. According to the WKY Guidebook, areas of varying cover types should be segregated into separate partial wetland assessment areas, so that the effects of the earlier successional vegetative community types can be evaluated apart from the more mature forested communities. By identifying the areas and associated acreages the plots represent, a detailed discussion of avoidance and minimization efforts can be applied, where practicable, and then calculated directly for the wetland resource impacted.

In 2006, Eco-tech provided areas and associated acreages that each of the sample plots represented. They also provided several estimate plot values for area, where scores would be different based on certain parameters such as proximity to streams.

***Eco-Tech - See tables below for estimated functional capacity units (FCU) for the Seven Hills Mine wetland impacts and avoidances based on average FCI's by wetland type.***

| Wetland Type | Total Impacted Acreage | Avg. FCI | FCU |
|---|---|---|---|
| PFO | 451.17 | 0.90 | 406.05 |
| PEM | 22.67 | 0.68 | 15.42 |
| PSS | 18.45 | 0.77 | 14.21 |
| **TOTAL** | **492.29** | *NA* | **435.68** |

| Wetland Type | Total Avoided Acreage | Avg. FCI | FCU |
|---|---|---|---|
| PFO | 218.14 | 0.90 | 196.33 |
| PEM | 25.09 | 0.68 | 17.06 |
| PSS | 56.62 | 0.77 | 43.60 |
| **TOTAL** | **299.85** | *NA* | **256.98** |

## 2. Direct comparison of 2006 and 2017 data

The relocation of plots prevented a direct comparison of all the 2006 and 2017 data. While we understand the need to represent the conditions and various cover types within the sites, adding plots to allow the direct comparison of all sites is preferred.

Additionally, there were changes in some individual variables which were not fully explained (Vslope, Vstore, Vwtslope, Vohor, Vahor) that little or no change would be expected given that site conditions were relatively unchanged with no anthropogenic changes.

***Eco-Tech - 2017 plots 2, 3, 4, 6, 8, and 9 are located in approximately the same location as in 2006. However, the 2006 HGM plots were not located with a sub-meter accuracy GPS so the position of the 2017 assessment points could be off by as much as 60-70' from original locations. Plot 1 was relocated to the nearest PEM as the 2006 location is currently a scrub-shrub community. Plot 5 was relocated to the west due to standing water as a result of beaver activity. Plot 7 was relocated to a different portion of the scrub-shrub community due to the 2006 plot now consisting of trees and not shrubs. Two additional plots (10 & 11) were added in estimated 85+ year old forested community stands. Unfortunately the 2006 data sheets and calculations are not available for Vslope, Vstore, Vwtslope, Vohor, Vahor.***

## 3. Presentation and comparison of plots as a FCI means

Eco-tech states that "overall wetland functions of the Pigeon Creek floodplain appear to have changed little over the last 11 years based on the comparative HGM assessment of the proposed mine site. No

recent anthropogenic impacts of natural disturbances were noted with the wetland assessment area and the site remains in a similar condition to 2006."

Variations in the individual functional scores and functional measures do not support this statement. For example, plot 4 appeared to have successional changes at both the functional level and the variable measures which include an increase in tree density, tree basal area, and snags, understory biomass reduction (no sub-index score change), and an increase in coarse woody debris. These measures indicate some maturation and successional development, but is skewed by reductions in other functions on every plot for export carbon, maintain characteristic hydrology, cycle nutrients, and remove and sequester elements and compounds. However, portions of those functions were based on reductions in variables that we would not expect to change on a site that has little disturbance and no anthropogenic impacts. See specific comments below on each variable.

**4. Representative Assessment of the Export Carbon function ($V_{surfcon}$)**

Eco-tech indicated that they changed their interpretation of this function for the 2017 assessment. As stated in the WKY Guidebook, Export of Carbon is "the capacity of the wetland to export the dissolved and particulate organic carbon produced in the riverine wetland. Mechanism include leaching of litter, flushing, displacement, and erosion." The implicit process in Organic Carbon Export is that the site is hydrologically connected to areas downstream. Although Eco-Tech has interpreted the surface connection variable very literally as an "altered channel" they did not consider the variable in the greater context of the site and other functions performed. The Temporary Storage of Surface Water and Particulate Retention functions both require surface water from the channel (represented by Vfreq) to enter the floodplain in order to be stored and drop sediment. This very connection, acknowledged by Eco-Tech as taking place at reference standard levels (FCI = 1.0 for both functions in all cover types) seems to contradict the assertion that the carbon export function does not take place. We question the scoring this function as zero, indicating the wetland is not performing organic carbon export in any capacity.

Based on a review of their data, the Export Carbon function was scored as zero based solely on their application of $V_{surfcon}$. The surface connection variable "represents the internal network of shallow surface water channels that usually connect the riverine wetland to the stream channel on low gradient, riverine floodplains. Typically, these channels intersect the river channel through low spots in the natural levee. When water levels are below channel full, these channels serve as the route for surface water, and the dissolved and particulate organic matter it carries, as it moves from the floodplain to the stream channel. This same network of channels routes overbank floodwater to riverine wetlands during the early stages of overbank flooding." By Eco-tech scoring the percent altered at 100 they are making the conclusion that the alteration of the system is preventing it from any surface connections and means there is no linear connection through tributaries or to Pigeon Creek itself. EPA recognizes Pigeon Creek has been channelized in the past and small tributaries to Pigeon Creek have down-cut to the point where it may require larger flow events to cause water to spill over the banks. However, it does not take an overbank event from Pigeon Creek to "back" water up onto the floodplain via the tributary/drainage channels. If those tributary channels cannot outlet the water due to higher flows in Pigeon Creek, the surface water draining to those channels will back up onto the floodplain. Once Pigeon Creek flows diminish, then the

flows from the tributaries will drain into Pigeon Creek along with dissolved and particulate organic matter which will be utilized downstream.

The intent of the $V_{surfcon}$ variable was to represent the necessity of surface water connections between the floodplain and the stream channel to transport organic material downstream to support aquatic organisms. The stressor this variable was intended to capture were levees which prevented floodplains from being inundated by larger stream flows. Although the exchange of surface water between Pigeon Creek and the adjacent riverine wetland/floodplain may be diminished, EPA contends it is not absent. Therefore, the variable scoring should be revised along with the functional capacity index to reflect a more realistic estimate of stream alterations that limit function.

(Noted that the Vohor is reduced in some locations plot 1, plot 3, plot 4, plot 6 where did it go? My assumption based on ecological processes is either that it was decomposed more to be part of Vahor (but there are no Vahor no a horizons documented) or exported downstream because it is actually connected which is not reflected in the functional assessment of Vsurfcon.)

> ***Eco-Tech - As discussed during last Friday's teleconference the most accurate method to quantify the sites surface connection alteration is to look at nearby unaltered stream reaches and determine the average number surface connections and relate that to current on-site connections. On the proposed Seven Hills mine site between Seven Hills Rd and New Harmony Rd there are five surface connections along the right bank of Pigeon Creek (3.3 river miles). This represents 1.5 surface connections per mile. Based on a review of the USGS 7.5 minute quadrangle there are an estimated 15 drainages along the western hill slope that historically would have drained through the floodplain and into Pigeon Creek or an estimated 4.5 drainages per mile. These 15 drainages are now confined to five due to channelization of Pigeon Creek. We used USGS National Hydrology Dataset (NHD) information to look at two nearby non-channelized stream reaches and their tributary connections. Pigeon Creek from just downstream of 50N continuing for approximately 3.1 miles downstream has 16 tributary connections or approximately 5.1 connections per mile on the right bank. Little Pigeon Creek from County Road 200N downstream for 3.2 miles has 13 tributary connections or approximately 4 connections per mile. An average of these two locations is 4.5 connections per mile as well as estimated on-site connection per mile (15 connections over 3.3 miles). Based on an unaltered surface floodplain connection average of 4.5 per mile we assess Vsurfcon at 67% (Subindex = 0.33).***
>
> | | |
> |---|---|
> | ***Seven Hills Surface Connections*** | ***1.5/mile*** |
> | ***Pigeon Creek Drainage Subsample Average*** | ***4.5/mile*** |
> | ***Percent Difference*** | ***67%*** |
> | ***$V_{surfcon}$ subindex*** | ***0.33*** |

## 5. Units of measurement

A careful examination of the field data that comprise the basis for the variable subindices indicated that in some instances appropriate plot size may not have been utilized. For instance, some variables are assessed using a 0.04 ha plot, some using a 0.004 ha plot, and others using a one square meter plot. Appropriate conversion factors may not have been used in all calculations which would affect the final variable field estimate and the associated subindex. The lack of documented assumptions and field conditions affecting variable measurement, along with incomplete field data sheets, made it difficult to decipher how the subindex scores were calculated. Field measurements and the calculation of subindex values should be reviewed and revised as appropriate.

***Eco-Tech – All plots followed the HGM methodologies for field plot layout. All tree basal areas, tree stems, and snags we sampled using one 0.04 ha circular plot. All woody debris ($V_{WD}$) and logs ($V_{LOG}$) variables were sampled along two 15 meter transects partially within the 0.04 ha plot. Understory stems ($V_{SSD}$) were sampled within the entire 0.04 ha circular plot for plots 1, 2, 3, 6, 7, 9, 10 and 11. Two $V_{SSD}$ 0.004 ha circular subplots were used for plots 4, 5, and 8 due to higher density of stems. Percent ground cover, "O" horizon, and "A" horizon variables were sampled using four square meter subplots. $V_{comp}$ ground vegetation was sampled using one square meter plot.***

Understanding changes in sub index measurement and scores. Below are listed the subindices which need clarification. The subindices are listed in the order described in the Appendix B for ease of review.

5.1. $V_{tract}$ – Provide the boundaries of tract on a map with an aerial.

***Eco-Tech - See Figure 2 for $V_{TRACT}$ boundary.***

5.2. $V_{slope}$ – The slope calculated changed from 0.003 in 2006 to 0.02 in 2017. Please explain the change in slope value.

***Eco-Tech – Without 2006 data sheets it is unknown how $V_{SLOPE}$ was calculated. Vslope was calculated on the revised plots using floodplain spot elevations between Seven Hills Road (388.8 msl) and Boonville New Harmony Road (382.8 msl). There is six feet of fall over 17,525 feet of valley length for a 0.03 Vslope. This variable has been revised.***

5.3. $V_{rough}$ – This is a measure of roughness. In plot 4 and 8, there was no change to macrotopography ($V_{macro}$), woody debris (Vwd) increased, and log biomass (Vlog) increased but overall roughness decreased. These other subindices indicate and increase in obstructions and would be correspondingly detected in this measure. Conversely in plot 2, there was no change in roughness despite a decrease in Vwd and Vlog. Recommend a review this measure and revision as appropriate.

***Eco-Tech – In Plot 4 it's true that macrotopography did not change and Vwd increased, however, Vlog was 0 in both 2006 and 2017. We assume that an increase in smaller class size sticks ($V_{WD}$) from 2006 to 2017 would not necessarily increase roughness due to increased obstructions. We did not consider small sticks to be "obstructions".***

***Again in Plot 8, it's true that macrotopography did not change but $V_{WD}$ and $V_{LOG}$ are both 9.5 based on the transect hitting only one class 3 size log with a 6" diameter. It's possible that in 2006 overall roughness of the plot was higher (more obstructions) than in 2017 but the woody debris transects did not hit any obstructions in 2006. Also, woody obstructions, and hummocks created by downed trees could have been present in 2006 but are no longer there 11 years later. Differences in exact plot locations could also contribute to this decrease. Again, without 2006 data sheets that show the values used for roughness components, it's difficult to know why there is a difference in roughness calculations.***

***Actually, $V_{ROUGH}$ increased (0.15 to 0.187) and there was an increase in $V_{WD}$ (29.4 to 37.4) and a decrease in $V_{LOG}$ (35 to 29.8). Regardless, subindices are 1.00 for all mentioned variables.***

5.4. $V_{soilint}$ – Eco-tech noted that there are no altered soils however, there were changes to other soil sub-indices to include measures of the O horizons and A horizons. See notes on each below.

***Eco-Tech - See appropriate variable below.***

5.5. $V_{wtslope}$ – It is not clear why the water table slope changed from 2006 to 2017. Again without a methodology it is difficult to understand the manner this subindex was calculated. However, it appears from a review of the data that Pigeon creek was treated as a ditch and not a dredged stream when calculating the watertable slope. Recommend the historic bottom elevation of Pigeon Creek used and the depth of alteration would be the difference between the old and new channel.

***Eco-Tech – $V_{WTSLOPE}$ has been calculated using the historic bottom elevation of Pigeon Creek to determine the depth of alteration. Historic Pigeon Creek bankfull depth was obtained from regional bankfull-channel dimensions using USGS StreamStats. We assumed that the original top of bank would have been bankfull. The current channel depth is approximately 15 feet and the historic depth is 5 feet for a 10 foot depth of alteration. See attached Pigeon Creek cross-sections for existing conditions and StreamStats for historic bankfull dimensions.***

5.6. $V_{store}$ – How did the floodplain storage change from 2006 to 2017? While the functional subindex was 1.0, it seems odd that there were changes in the ratio of floodplain to channel width.

***Eco-Tech – Without 2006 data sheets it is unknown how $V_{STORE}$ was originally calculated. In 2017 we assumed an average 50 foot channel width for Pigeon Creek. All floodplain widths were measured from USGS 7.5 minute topographic maps. Widths are measured from the contour interval at the toe-of-slope to the opposite bank toe-of-slope in a line running perpendicular to the valley through the plot location.***

5.7. $V_{surfcon}$ – See note comments on Export Carbon above. This subindex score needs to be revised.

***Eco-Tech – See response to 4. The subindex has been revised to 0.33.***

5.8. $V_{ten}$ – Explain the increase of tree density in plot 3, 4, 5, 6, and 9 and how it may be reflected in another metric such as a change in understory vegetation biomass (which could reflect understory succession into the tree level) or Vsnag (which may reflect the death of trees from 2011). Also

explain the reduction in tree density in plot 2 and how it relates to changes conversely in other metrics.

***Eco-Tech – The difference in tree density is most likely attributed to slightly different plot locations between 2006 and 2017 assessments. A review of aerial photography shows a timber harvest took place in the Plot 2 area during 2009 and 2010. This was the only noticeable logging we noted in the plots.***

5.9. $V_{tba}$ – Explain the changes in tree basal area. For example in plot 3, there was an increase in tree density by 174 stems/ha but the tree basal area only increased slightly by 0.03 $m^2$/ha. Also review the reduction in basal area on plot 6, when the tree density increased by 125 stems/ha.

***Eco-Tech – Plot 3 was relocated due to deep standing water. Plot 6 was sampled in approximately the same area both years. However, this area contains large trees and a slight shift in plot location would result in different $V_{TBA}$ values.***

5.10. $V_{ssd}$ – This metric was incorrectly calculated. Based on the field datasheets it appears Eco-tech used the total stems counted in two plots not the average of those counts. This change increases the stem count and affects the functional subindex. For example, plot 1 this resulted in a functional measure of 850 instead of 725 stems per hectare and resulted in a lower functional subindex score of 0.50 instead of 0.55. The data for measures should be reviewed and recalculated as appropriate.

***Eco-Tech – Understory stems were sampled within the entire 0.04 ha circular plot for plots 1, 2, 3, 6, 7, 9, 10 and 11. Two $V_{SSD}$ 0.004 ha circular subplots were used for plots 4, 5, and 8 due to higher density of stems. Plots 4, 5, and 8 were incorrectly calculated. They have been revised to reflect an average as directed.***

5.11. $V_{ahor}$ - Eco-tech did not document any "A horizons" during the 2017 data collection. The Web Soil Survey for the site indicates all soil series mapped on the site developed A-horizons. The procedure outlined in the WKY Guidebook to verify the presence of an A-horizon requires, the soil horizon begin just below the O-horizon or at the surface and is considered an "A" horizon, if it is at least 7.6 cm (3in) thick and has a munsell color value less than or equal to 4." As Eco-Tech noted in their narrative and is reflected in the soil integrity subindex (Vsoilint), the soils on site have not been altered. Therefore, EPA would anticipate that the soils structure would not change. Explain the changes in the "A horizon" subindex.

***Eco-Tech – $V_{AHOR}$ was misinterpreted and after a more thorough review of the Bonnie and Birds soil series it has been determined that all plots have an "A" horizon of at least 3 inches thick and a color value less than or equal to 4. Both soil series lack a B-horizon but have a relatively thick (15 to 28 inches) A-horizon located just below the O-horizon. Soils sampled within the proposed mine site generally exhibit characteristics of a depleted matrix hydric soil indicator. This subindex has been revised.***

5.12. $V_{wd}$- It appears there were errors in calculations within the datasheets. Specifically, on size class 3 tons per acre on the data sheet which appear to be corrected on the final spread sheet. These calculations should be reviewed and corrected as needed.

***Eco-Tech – In Plot 3, we accidentally inverted $V_{LOG}$ and $V_{WD}$. Plots 6, 8 and 9 were all tenths rounding errors. All plots have been revised.***

**6. EPA Comments on Potential Mitigation Site Baselines**

***Eco-Tech – Mitigation sites will be assessed under a separate memorandum at a later date.***

If you have any questions or require additional information, please contact me at (502) 259-0470 or rlarsen@ecotechinc.com.

Attachments:

1. 2006 and 2017 HGM Variables and Indices
2. Pigeon Creek cross-sections
3. Pigeon Creek StreamStats Report
4. Location Maps
5. Field Data Sheets

## Functional Capacity Indices

Low Gradient Riverine Wetlands in Western Kentucky

## Plot 1B (4-05-2017)

## PEM

| Variables | Units | 2006 - Plot 1A | | 2017 - Plot 1B | |
|---|---|---|---|---|---|
| | | Measure | Subindex | Measure | Subindex |
| 1. *Vtract* | ha | 890 | 0.70 | 890 | 0.70 |
| 2. *Vcore* | % | 47 | 1.00 | 47 | 1.00 |
| 3. *Vconnect* | % | 72 | 1.00 | 72 | 1.00 |
| 4. *Vslope* | % | 0.003 | 1.00 | 0.03 | 1.00 |
| 5. *Vstore* | % | 55.6 | 1.00 | 85 | 1.00 |
| 6. *Vmacro* | no units | 6 | 1.00 | 6 | 1.00 |
| 7. *Vfreq* | years | 1 | 1.00 | 1 | 1.00 |
| 8. *Vrough* | no units | 0.23 | 1.00 | 0.087 | 0.86 |
| 9. *Vsoilint* | % | 0 | 1.00 | 0 | 1.00 |
| 10. *Vwtf* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 11. *Vwtd* | inches | 1 | 1.00 | 1 | 1.00 |
| 12. *Vwtslope* | % | 26 | 0.74 | 38 | 0.62 |
| 13. *Vsoilperm* | in/hr | 0.4 | 1.00 | 0.4 | 1.00 |
| 14. *Vpore* | % | 43.5 | 1.00 | 43 | 1.00 |
| 15. *Vsurfcon* | % | 100 | 0.00 | 67 | 0.33 |
| 16. *Vclay* | % | 0 | 1.00 | 0 | 1.00 |
| 17. *Vredox* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 18. *Vtba* | m2/ha | 0 | 0.00 | 0 | 0.00 |
| 19. *Vtden* | stems/ha | 0 | 0.00 | 0 | 0.00 |
| 20. *Vsnag* | stems/ha | 0 | 0.00 | 0 | 0.00 |
| 21. *Vwd* | m3/ha | 50.3 | 1.00 | 0 | 0.00 |
| 22. *Vlog* | m3/ha | 17.5 | 1.00 | 0 | 0.00 |
| 23. *Vssd* | stems/ha | 1475 | 0.50 | 850 | 0.50 |
| 24. *Vgvc* | % | 85 | 0.27 | 97.5 | 0.13 |
| 25. *Vohor* | % | 76 | 1.00 | 45 | 0.75 |
| 26. *Vahor* | % | 25 | 0.31 | 100 | 1.00 |
| 27. *Vcomp* | % | 75 | 0.75 | 33 | 0.33 |

| FCI Function | 2006 | 2017 |
|---|---|---|
| Temporarily Store Surface Water | 1.00 | 0.96 |
| Maintain Characteristic Subsurface Hydrology | 0.93 | 0.89 |
| Cycle Nutrients | 0.51 | 0.40 |
| Remove and Sequester Elements and Compounds | 0.91 | 0.97 |
| Retain Particulates | 1.00 | 0.96 |
| Export Organic Carbon | 0.00 | 0.46 |
| Maintain Characteristic Plant Community | 0.61 | 0.41 |
| Provide Habitat for Wildlife | 0.58 | 0.37 |
| **MEAN** | **0.69** | **0.68** |

## Functional Capacity Indices

Low Gradient Riverine Wetlands in Western Kentucky

## Plot 2 (4-06-2017)

PFO

| Variables | Units | 2006 Measure | 2006 Subindex | 2017 Measure | 2017 Subindex |
|---|---|---|---|---|---|
| 1. *Vtract* | ha | 890 | 0.70 | 890 | 0.70 |
| 2. *Vcore* | % | 47 | 1.00 | 47 | 1.00 |
| 3. *Vconnect* | % | 72 | 1.00 | 72 | 1.00 |
| 4. *Vslope* | % | 0.003 | 1.00 | 0.03 | 1.00 |
| 5. *Vstore* | % | 56.5 | 1.00 | 68 | 1.00 |
| 6. *Vmacro* | no units | 6 | 1.00 | 6 | 1.00 |
| 7. *Vfreq* | years | 1 | 1.00 | 1 | 1.00 |
| 8. *Vrough* | no units | 0.15 | 1.00 | 0.187 | 1.00 |
| 9. *Vsoilint* | % | 0 | 1.00 | 0 | 1.00 |
| 10. *Vwtf* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 11. *Vwtd* | inches | 1 | 1.00 | 1 | 1.00 |
| 12. *Vwtslope* | % | 26 | 0.74 | 38 | 0.62 |
| 13. *Vsoilperm* | in/hr | 0.4 | 1.00 | 0.4 | 1.00 |
| 14. *Vpore* | % | 43.5 | 1.00 | 43 | 1.00 |
| 15. *Vsurfcon* | % | 90 | 0.10 | 67 | 0.33 |
| 16. *Vclay* | % | 0 | 1.00 | 0 | 1.00 |
| 17. *Vredox* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 18. *Vtba* | m2/ha | 28.5 | 1.00 | 10.925 | 0.55 |
| 19. *Vtden* | stems/ha | 900 | 0.85 | 600 | 1.00 |
| 20. *Vsnag* | stems/ha | 225 | 0.10 | 0 | 0.00 |
| 21. *Vwd* | m3/ha | 29.4 | 1.00 | 37.4 | 1.00 |
| 22. *Vlog* | m3/ha | 35 | 1.00 | 29.856 | 1.00 |
| 23. *Vssd* | stems/ha | 500 | 1.00 | 1325 | 0.50 |
| 24. *Vgvc* | % | 70 | 0.44 | 28 | 0.91 |
| 25. *Vohor* | % | 100 | 1.00 | 100 | 1.00 |
| 26. *Vahor* | % | 71 | 0.89 | 100 | 1.00 |
| 27. *Vcomp* | % | 100 | 1.00 | 50 | 0.50 |

| FCI Function | 2006 | 2017 |
|---|---|---|
| Temporarily Store Surface Water | 1.00 | 1.00 |
| Maintain Characteristic Subsurface Hydrology | 0.93 | 0.89 |
| Cycle Nutrients | 0.89 | 0.83 |
| Remove and Sequester Elements and Compounds | 0.99 | 1.00 |
| Retain Particulates | 1.00 | 1.00 |
| Export Organic Carbon | 0.56 | 0.76 |
| Maintain Characteristic Plant Community | 0.98 | 0.80 |
| Provide Habitat for Wildlife | 0.87 | 0.76 |
| **MEAN** | **0.90** | **0.88** |

## Functional Capacity Indices

Low Gradient Riverine Wetlands in Western Kentucky

## Plot 3 (4-06-2017)

PFO

| Variables | Units | 2006 Measure | 2006 Subindex | 2017 Measure | 2017 Subindex |
|---|---|---|---|---|---|
| 1. *Vtract* | ha | 890 | 0.70 | 890 | 0.70 |
| 2. *Vcore* | % | 47 | 1.00 | 47 | 1.00 |
| 3. *Vconnect* | % | 72 | 1.00 | 72 | 1.00 |
| 4. *Vslope* | % | 0.003 | 1.00 | 0.03 | 1.00 |
| 5. *Vstore* | % | 51.6 | 0.94 | 64 | 1.00 |
| 6. *Vmacro* | no units | 6 | 1.00 | 6 | 1.00 |
| 7. *Vfreq* | years | 1 | 1.00 | 1 | 1.00 |
| 8. *Vrough* | no units | 0.16 | 1.00 | 0.16 | 1.00 |
| 9. *Vsoilint* | % | 0 | 1.00 | 0 | 1.00 |
| 10. *Vwtf* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 11. *Vwtd* | inches | 1 | 1.00 | 1 | 1.00 |
| 12. *Vwtslope* | % | 26 | 0.74 | 38 | 0.62 |
| 13. *Vsoilperm* | in/hr | 0.4 | 1.00 | 0.4 | 1.00 |
| 14. *Vpore* | % | 43.5 | 1.00 | 43 | 1.00 |
| 15. *Vsurfcon* | % | 75 | 0.25 | 67 | 0.33 |
| 16. *Vclay* | % | 0 | 1.00 | 0 | 1.00 |
| 17. *Vredox* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 18. *Vtba* | m2/ha | 40.6 | 1.00 | 40.63 | 1.00 |
| 19. *Vtden* | stems/ha | 525 | 1.00 | 700 | 1.00 |
| 20. *Vsnag* | stems/ha | 50 | 1.00 | 100 | 0.10 |
| 21. *Vwd* | m3/ha | 59.1 | 0.91 | 10.3 | 0.52 |
| 22. *Vlog* | m3/ha | 26.2 | 1.00 | 6.2 | 0.62 |
| 23. *Vssd* | stems/ha | 1500 | 0.50 | 250 | 1.00 |
| 24. *Vgvc* | % | 25 | 0.94 | 38 | 0.80 |
| 25. *Vohor* | % | 100 | 1.00 | 95 | 1.00 |
| 26. *Vahor* | % | 51 | 0.64 | 100 | 1.00 |
| 27. *Vcomp* | % | 56 | 0.56 | 33 | 0.33 |

| FCI Function | 2006 | 2017 |
|---|---|---|
| Temporarily Store Surface Water | 0.98 | 1.00 |
| Maintain Characteristic Subsurface Hydrology | 0.93 | 0.89 |
| Cycle Nutrients | 0.83 | 0.89 |
| Remove and Sequester Elements and Compounds | 0.95 | 1.00 |
| Retain Particulates | 0.98 | 1.00 |
| Export Organic Carbon | 0.69 | 0.66 |
| Maintain Characteristic Plant Community | 0.88 | 0.82 |
| Provide Habitat for Wildlife | 0.93 | 0.78 |
| **MEAN** | **0.90** | **0.88** |

## Functional Capacity Indices

Low Gradient Riverine Wetlands in Western Kentucky

## Plot 4 (4-06-2017)

PFO

| Variables | Units | 2006 Measure | 2006 Subindex | 2017 Measure | 2017 Subindex |
|---|---|---|---|---|---|
| 1. *Vtract* | ha | 890 | 0.70 | 890 | 0.70 |
| 2. *Vcore* | % | 47 | 1.00 | 47 | 1.00 |
| 3. *Vconnect* | % | 72 | 1.00 | 72 | 1.00 |
| 4. *Vslope* | % | 0.003 | 1.00 | 0.03 | 1.00 |
| 5. *Vstore* | % | 260 | 1.00 | 112 | 1.00 |
| 6. *Vmacro* | no units | 6 | 1.00 | 6 | 1.00 |
| 7. *Vfreq* | years | 1 | 1.00 | 1 | 1.00 |
| 8. *Vrough* | no units | 0.18 | 1.00 | 0.145 | 1.00 |
| 9. *Vsoilint* | % | 0 | 1.00 | 0 | 1.00 |
| 10. *Vwtf* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 11. *Vwtd* | inches | 1 | 1.00 | 1 | 1.00 |
| 12. *Vwtslope* | % | 26 | 0.74 | 38 | 0.62 |
| 13. *Vsoilperm* | in/hr | 0.4 | 1.00 | 0.4 | 1.00 |
| 14. *Vpore* | % | 43.5 | 1.00 | 43 | 1.00 |
| 15. *Vsurfcon* | % | 50 | 0.50 | 67 | 0.33 |
| 16. *Vclay* | % | 0 | 1.00 | 0 | 1.00 |
| 17. *Vredox* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 18. *Vtba* | m2/ha | 2.6 | 0.13 | 52.08 | 1.00 |
| 19. *Vtden* | stems/ha | 225 | 0.56 | 1125 | 0.70 |
| 20. *Vsnag* | stems/ha | 0 | 0.00 | 50 | 1.00 |
| 21. *Vwd* | m3/ha | 1.5 | 0.08 | 11.1 | 0.56 |
| 22. *Vlog* | m3/ha | 0 | 0.00 | 0 | 0.00 |
| 23. *Vssd* | stems/ha | 12200 | 0.50 | 1250 | 0.50 |
| 24. *Vgvc* | % | 95 | 0.16 | 30 | 0.89 |
| 25. *Vohor* | % | 95 | 1.00 | 81 | 1.00 |
| 26. *Vahor* | % | 0 | 0.00 | 100 | 1.00 |
| 27. *Vcomp* | % | 83 | 0.83 | 83 | 0.83 |

| FCI Function | 2006 | 2017 |
|---|---|---|
| Temporarily Store Surface Water | 1.00 | 1.00 |
| Maintain Characteristic Subsurface Hydrology | 0.93 | 0.89 |
| Cycle Nutrients | 0.31 | 0.82 |
| Remove and Sequester Elements and Compounds | 0.87 | 1.00 |
| Retain Particulates | 1.00 | 1.00 |
| Export Organic Carbon | 0.62 | 0.67 |
| Maintain Characteristic Plant Community | 0.77 | 0.92 |
| Provide Habitat for Wildlife | 0.62 | 0.88 |
| **MEAN** | **0.76** | **0.90** |

**Functional Capacity Indices** Low Gradient Riverine Wetlands in Western Kentucky

**Plot 5B (4-06-2017)** **PSS**

| Variables | Units | 2006 - Plot 5A | | 2017 - Plot 5B | |
|---|---|---|---|---|---|
| | | Measure | Subindex | Measure | Subindex |
| 1. *Vtract* | ha | 890 | 0.70 | 890 | 0.70 |
| 2. *Vcore* | % | 47 | 1.00 | 47 | 1.00 |
| 3. *Vconnect* | % | 72 | 1.00 | 72 | 1.00 |
| 4. *Vslope* | % | 0.003 | 1.00 | 0.03 | 1.00 |
| 5. *Vstore* | % | 312.5 | 1.00 | 95 | 1.00 |
| 6. *Vmacro* | no units | 6 | 1.00 | 6 | 1.00 |
| 7. *Vfreq* | years | 1 | 1.00 | 1 | 1.00 |
| 8. *Vrough* | no units | 0.2 | 1.00 | 0.165 | 1.00 |
| 9. *Vsoilint* | % | 0 | 1.00 | 0 | 1.00 |
| 10. *Vwtf* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 11. *Vwtd* | inches | 1 | 1.00 | 1 | 1.00 |
| 12. *Vwtslope* | % | 26 | 0.74 | 38 | 0.62 |
| 13. *Vsoilperm* | in/hr | 0.4 | 1.00 | 0.4 | 1.00 |
| 14. *Vpore* | % | 43.5 | 1.00 | 43 | 1.00 |
| 15. *Vsurfcon* | % | 75 | 0.25 | 67 | 0.33 |
| 16. *Vclay* | % | 0 | 1.00 | 0 | 1.00 |
| 17. *Vredox* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 18. *Vtba* | m2/ha | 6.4 | 0.32 | 12.77 | 0.64 |
| 19. *Vtden* | stems/ha | 150 | 0.38 | 925 | 0.81 |
| 20. *Vsnag* | stems/ha | 225 | 0.10 | 0 | 0.00 |
| 21. *Vwd* | m3/ha | 42.1 | 1.00 | 23.6 | 1.00 |
| 22. *Vlog* | m3/ha | 35 | 1.00 | 17.354 | 1.00 |
| 23. *Vssd* | stems/ha | 4725 | 0.50 | 3500 | 0.50 |
| 24. *Vgvc* | % | 88 | 0.24 | 7.5 | 1.00 |
| 25. *Vohor* | % | 100 | 1.00 | 100 | 1.00 |
| 26. *Vahor* | % | 56 | 0.70 | 100 | 1.00 |
| 27. *Vcomp* | % | 44 | 0.44 | 67 | 0.67 |

| FCI Function | 2006 | 2017 |
|---|---|---|
| Temporarily Store Surface Water | 1.00 | 1.00 |
| Maintain Characteristic Subsurface Hydrology | 0.93 | 0.89 |
| Cycle Nutrients | 0.63 | 0.86 |
| Remove and Sequester Elements and Compounds | 0.96 | 1.00 |
| Retain Particulates | 1.00 | 1.00 |
| Export Organic Carbon | 0.71 | 0.76 |
| Maintain Characteristic Plant Community | 0.63 | 0.84 |
| Provide Habitat for Wildlife | 0.65 | 0.77 |
| **MEAN** | **0.81** | **0.89** |

## Functional Capacity Indices

Low Gradient Riverine Wetlands in Western Kentucky

## Plot 6 (4-06-2017)

PFO

| Variables | Units | 2006 | | 2017 | |
|---|---|---|---|---|---|
| | | Measure | Subindex | Measure | Subindex |
| 1. *Vtract* | ha | 890 | 0.70 | 890 | 0.70 |
| 2. *Vcore* | % | 47 | 1.00 | 47 | 1.00 |
| 3. *Vconnect* | % | 72 | 1.00 | 72 | 1.00 |
| 4. *Vslope* | % | 0.003 | 1.00 | 0.03 | 1.00 |
| 5. *Vstore* | % | 88.2 | 1.00 | 60 | 1.00 |
| 6. *Vmacro* | no units | 6 | 1.00 | 6 | 1.00 |
| 7. *Vfreq* | years | 1 | 1.00 | 1 | 1.00 |
| 8. *Vrough* | no units | 0.17 | 1.00 | 0.165 | 1.00 |
| 9. *Vsoilint* | % | 0 | 1.00 | 0 | 1.00 |
| 10. *Vwtf* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 11. *Vwtd* | inches | 1 | 1.00 | 1 | 1.00 |
| 12. *Vwtslope* | % | 26 | 0.74 | 38 | 0.62 |
| 13. *Vsoilperm* | in/hr | 0.4 | 1.00 | 0.4 | 1.00 |
| 14. *Vpore* | % | 43.5 | 1.00 | 43 | 1.00 |
| 15. *Vsurfcon* | % | 100 | 0.00 | 67 | 0.33 |
| 16. *Vclay* | % | 0 | 1.00 | 0 | 1.00 |
| 17. *Vredox* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 18. *Vtba* | m2/ha | 49.5 | 1.00 | 39.07 | 1.00 |
| 19. *Vtden* | stems/ha | 550 | 1.00 | 675 | 1.00 |
| 20. *Vsnag* | stems/ha | 225 | 0.10 | 50 | 1.00 |
| 21. *Vwd* | m3/ha | 58.7 | 0.91 | 85.8 | 0.64 |
| 22. *Vlog* | m3/ha | 8.7 | 0.87 | 80.8 | 0.80 |
| 23. *Vssd* | stems/ha | 575 | 0.85 | 450 | 1.00 |
| 24. *Vgvc* | % | 47 | 0.70 | 11.3 | 1.00 |
| 25. *Vohor* | % | 98 | 1.00 | 83.8 | 1.00 |
| 26. *Vahor* | % | 81 | 1.00 | 100 | 1.00 |
| 27. *Vcomp* | % | 33 | 0.33 | 44.3 | 0.44 |

| FCI Function | 2006 | 2017 |
|---|---|---|
| Temporarily Store Surface Water | 1.00 | 1.00 |
| Maintain Characteristic Subsurface Hydrology | 0.93 | 0.89 |
| Cycle Nutrients | 0.91 | 0.94 |
| Remove and Sequester Elements and Compounds | 1.00 | 1.00 |
| Retain Particulates | 1.00 | 1.00 |
| Export Organic Carbon | 0.00 | 0.69 |
| Maintain Characteristic Plant Community | 0.82 | 0.85 |
| Provide Habitat for Wildlife | 0.80 | 0.91 |
| **MEAN** | **0.81** | **0.91** |

**Functional Capacity Indices** Low Gradient Riverine Wetlands in Western Kentucky

**Plot 7B (4-06-2017)** **PSS**

| Variables | Units | 2006 - Plot 7A Measure | 2006 - Plot 7A Subindex | 2017 - Plot 7B Measure | 2017 - Plot 7B Subindex |
|---|---|---|---|---|---|
| 1. *Vtract* | ha | 890 | 0.70 | 890 | 0.70 |
| 2. *Vcore* | % | 47 | 1.00 | 47 | 1.00 |
| 3. *Vconnect* | % | 72 | 1.00 | 72 | 1.00 |
| 4. *Vslope* | % | 0.003 | 1.00 | 0.03 | 1.00 |
| 5. *Vstore* | % | 377.8 | 1.00 | 67 | 1.00 |
| 6. *Vmacro* | no units | 6 | 1.00 | 6 | 1.00 |
| 7. *Vfreq* | years | 1 | 1.00 | 1 | 1.00 |
| 8. *Vrough* | no units | 0.19 | 1.00 | 0.132 | 1.00 |
| 9. *Vsoilint* | % | 0 | 1.00 | 0 | 1.00 |
| 10. *Vwtf* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 11. *Vwtd* | inches | 1 | 1.00 | 1 | 1.00 |
| 12. *Vwtslope* | % | 26 | 0.74 | 38 | 0.62 |
| 13. *Vsoilperm* | in/hr | 0.4 | 1.00 | 0.4 | 1.00 |
| 14. *Vpore* | % | 43.5 | 1.00 | 43 | 1.00 |
| 15. *Vsurfcon* | % | 100 | 0.00 | 67 | 0.33 |
| 16. *Vclay* | % | 0 | 1.00 | 0 | 1.00 |
| 17. *Vredox* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 18. *Vtba* | m2/ha | 1.9 | 0.10 | 1.2 | 0.06 |
| 19. *Vtden* | stems/ha | 125 | 0.31 | 25 | 0.06 |
| 20. *Vsnag* | stems/ha | 50 | 1.00 | 0 | 0.00 |
| 21. *Vwd* | m3/ha | 17.3 | 0.87 | 0 | 0.00 |
| 22. *Vlog* | m3/ha | 8.7 | 0.87 | 0 | 0.00 |
| 23. *Vssd* | stems/ha | 950 | 0.50 | 575 | 0.85 |
| 24. *Vgvc* | % | 90 | 0.21 | 72 | 0.42 |
| 25. *Vohor* | % | 84 | 1.00 | 100 | 1.00 |
| 26. *Vahor* | % | 31 | 0.39 | 100 | 1.00 |
| 27. *Vcomp* | % | 67 | 0.67 | 33 | 0.33 |

| FCI Function | 2006 | 2017 |
|---|---|---|
| Temporarily Store Surface Water | 1.00 | 1.00 |
| Maintain Characteristic Subsurface Hydrology | 0.93 | 0.89 |
| Cycle Nutrients | 0.51 | 0.55 |
| Remove and Sequester Elements and Compounds | 0.92 | 1.00 |
| Retain Particulates | 1.00 | 1.00 |
| Export Organic Carbon | 0.00 | 0.54 |
| Maintain Characteristic Plant Community | 0.66 | 0.44 |
| Provide Habitat for Wildlife | 0.76 | 0.43 |
| **MEAN** | **0.72** | **0.73** |

## Functional Capacity Indices

Low Gradient Riverine Wetlands in Western Kentucky

## Plot 8 (4-07-2017)

## PSS

| Variables | Units | 2006 | | 2017 | |
|---|---|---|---|---|---|
| | | Measure | Subindex | Measure | Subindex |
| 1. *Vtract* | ha | 890 | 0.70 | 890 | 0.70 |
| 2. *Vcore* | % | 47 | 1.00 | 47 | 1.00 |
| 3. *Vconnect* | % | 72 | 1.00 | 72 | 1.00 |
| 4. *Vslope* | % | 0.003 | 1.00 | 0.03 | 1.00 |
| 5. *Vstore* | % | 53.2 | 0.97 | 63 | 1.00 |
| 6. *Vmacro* | no units | 6 | 1.00 | 6 | 1.00 |
| 7. *Vfreq* | years | 1 | 1.00 | 1 | 1.00 |
| 8. *Vrough* | no units | 0.18 | 1.00 | 0.095 | 0.91 |
| 9. *Vsoilint* | % | 0 | 1.00 | 0 | 1.00 |
| 10. *Vwtf* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 11. *Vwtd* | inches | 1 | 1.00 | 1 | 1.00 |
| 12. *Vwtslope* | % | 26 | 0.74 | 38 | 0.62 |
| 13. *Vsoilperm* | in/hr | 0.4 | 1.00 | 0.4 | 1.00 |
| 14. *Vpore* | % | 43.5 | 1.00 | 43 | 1.00 |
| 15. *Vsurfcon* | % | 100 | 0.00 | 67 | 0.33 |
| 16. *Vclay* | % | 0 | 1.00 | 0 | 1.00 |
| 17. *Vredox* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 18. *Vtba* | m2/ha | 0 | 0.00 | 0 | 0.00 |
| 19. *Vtden* | stems/ha | 0 | 0.00 | 0 | 0.00 |
| 20. *Vsnag* | stems/ha | 2500 | 0.10 | 0 | 0.00 |
| 21. *Vwd* | m3/ha | 0 | 0.00 | 9.5 | 0.48 |
| 22. *Vlog* | m3/ha | 0 | 0.00 | 9.5 | 0.95 |
| 23. *Vssd* | stems/ha | 60000 | 0.50 | 10000 | 0.50 |
| 24. *Vgvc* | % | 5 | 1.00 | 0 | 1.00 |
| 25. *Vohor* | % | 100 | 1.00 | 100 | 1.00 |
| 26. *Vahor* | % | 0 | 0.00 | 100 | 1.00 |
| 27. *Vcomp* | % | 0 | 0.00 | 0 | 0.00 |

| FCI Function | 2006 | 2017 |
|---|---|---|
| Temporarily Store Surface Water | 0.99 | 0.98 |
| Maintain Characteristic Subsurface Hydrology | 0.93 | 0.89 |
| Cycle Nutrients | 0.42 | 0.66 |
| Remove and Sequester Elements and Compounds | 0.87 | 1.00 |
| Retain Particulates | 0.99 | 0.98 |
| Export Organic Carbon | 0.00 | 0.65 |
| Maintain Characteristic Plant Community | 0.00 | 0.00 |
| Provide Habitat for Wildlife | 0.34 | 0.43 |
| **MEAN** | **0.57** | **0.70** |

## Functional Capacity Indices

Low Gradient Riverine Wetlands in Western Kentucky

## Plot 9 (4-07-2017)

PFO

| Variables | Units | 2006 Measure | 2006 Subindex | 2017 Measure | 2017 Subindex |
|---|---|---|---|---|---|
| 1. *Vtract* | ha | 890 | 0.70 | 890 | 0.70 |
| 2. *Vcore* | % | 47 | 1.00 | 47 | 1.00 |
| 3. *Vconnect* | % | 72 | 1.00 | 72 | 1.00 |
| 4. *Vslope* | % | 0.003 | 1.00 | 0.03 | 1.00 |
| 5. *Vstore* | % | 55 | 1.00 | 63 | 1.00 |
| 6. *Vmacro* | no units | 6 | 1.00 | 6 | 1.00 |
| 7. *Vfreq* | years | 1 | 1.00 | 1 | 1.00 |
| 8. *Vrough* | no units | 0.19 | 1.00 | 0.145 | 1.00 |
| 9. *Vsoilint* | % | 0 | 1.00 | 0 | 1.00 |
| 10. *Vwtf* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 11. *Vwtd* | inches | 1 | 1.00 | 1 | 1.00 |
| 12. *Vwtslope* | % | 26 | 0.74 | 38 | 0.62 |
| 13. *Vsoilperm* | in/hr | 0.4 | 1.00 | 0.4 | 1.00 |
| 14. *Vpore* | % | 43.5 | 1.00 | 43 | 1.00 |
| 15. *Vsurfcon* | % | 100 | 0.00 | 67 | 0.33 |
| 16. *Vclay* | % | 0 | 1.00 | 0 | 1.00 |
| 17. *Vredox* | p(1) / a(0) | 1 | 1.00 | 1 | 1.00 |
| 18. *Vtba* | m2/ha | 15.3 | 0.77 | 32.1 | 1.00 |
| 19. *Vtden* | stems/ha | 600 | 1.00 | 750 | 1.00 |
| 20. *Vsnag* | stems/ha | 250 | 0.10 | 25 | 0.83 |
| 21. *Vwd* | m3/ha | 45.9 | 1.00 | 32.4 | 1.00 |
| 22. *Vlog* | m3/ha | 17.5 | 1.00 | 24.1 | 1.00 |
| 23. *Vssd* | stems/ha | 700 | 0.60 | 375 | 1.00 |
| 24. *Vgvc* | % | 40 | 0.78 | 46 | 0.71 |
| 25. *Vohor* | % | 84 | 1.00 | 97.5 | 1.00 |
| 26. *Vahor* | % | 75 | 0.94 | 100 | 1.00 |
| 27. *Vcomp* | % | 83 | 0.83 | 100 | 1.00 |

| FCI Function | 2006 | 2017 |
|---|---|---|
| Temporarily Store Surface Water | 1.00 | 1.00 |
| Maintain Characteristic Subsurface Hydrology | 0.93 | 0.89 |
| Cycle Nutrients | 0.85 | 0.95 |
| Remove and Sequester Elements and Compounds | 0.99 | 1.00 |
| Retain Particulates | 1.00 | 1.00 |
| Export Organic Carbon | 0.00 | 0.76 |
| Maintain Characteristic Plant Community | 0.93 | 1.00 |
| Provide Habitat for Wildlife | 0.84 | 0.96 |
| **MEAN** | **0.82** | **0.95** |

## Functional Capacity Indices

Low Gradient Riverine Wetlands in Western Kentucky

## Plot 10 (4-14-2017)

PFO

| Variables | Units | 2017 Measure | 2017 Subindex |
|---|---|---|---|
| 1. *Vtract* | ha | 890 | 0.70 |
| 2. *Vcore* | % | 47 | 1.00 |
| 3. *Vconnect* | % | 72 | 1.00 |
| 4. *Vslope* | % | 0.03 | 1.00 |
| 5. *Vstore* | % | 114 | 1.00 |
| 6. *Vmacro* | no units | 6 | 1.00 |
| 7. *Vfreq* | years | 1 | 1.00 |
| 8. *Vrough* | no units | 0.145 | 1.00 |
| 9. *Vsoilint* | % | 0 | 1.00 |
| 10. *Vwtf* | p(1) / a(0) | 1 | 1.00 |
| 11. *Vwtd* | inches | 1 | 1.00 |
| 12. *Vwtslope* | % | 38 | 0.62 |
| 13. *Vsoilperm* | in/hr | 0.4 | 1.00 |
| 14. *Vpore* | % | 43 | 1.00 |
| 15. *Vsurfcon* | % | 67 | 0.33 |
| 16. *Vclay* | % | 0 | 1.00 |
| 17. *Vredox* | p(1) / a(0) | 1 | 1.00 |
| 18. *Vtba* | m2/ha | 34.7 | 1.00 |
| 19. *Vtden* | stems/ha | 275 | 0.69 |
| 20. *Vsnag* | stems/ha | 0 | 0.00 |
| 21. *Vwd* | m3/ha | 25.5 | 1.00 |
| 22. *Vlog* | m3/ha | 6.06 | 0.61 |
| 23. *Vssd* | stems/ha | 875 | 0.50 |
| 24. *Vgvc* | % | 19 | 1.00 |
| 25. *Vohor* | % | 96 | 1.00 |
| 26. *Vahor* | % | 100 | 1.00 |
| 27. *Vcomp* | % | 78 | 0.78 |

| FCI Function | 2017 |
|---|---|
| Temporarily Store Surface Water | 1.00 |
| Maintain Characteristic Subsurface Hydrology | 0.89 |
| Cycle Nutrients | 0.92 |
| Remove and Sequester Elements and Compounds | 1.00 |
| Retain Particulates | 1.00 |
| Export Organic Carbon | 0.76 |
| Maintain Characteristic Plant Community | 0.90 |
| Provide Habitat for Wildlife | 0.79 |
| **MEAN** | **0.91** |

## Functional Capacity Indices

Low Gradient Riverine Wetlands in Western Kentucky

## Plot 11 (4-14-2017)

PFO

| Variables | Units | 2017 Measure | 2017 Subindex |
|---|---|---|---|
| 1. *Vtract* | ha | 890 | 0.70 |
| 2. *Vcore* | % | 47 | 1.00 |
| 3. *Vconnect* | % | 72 | 1.00 |
| 4. *Vslope* | % | 0.03 | 1.00 |
| 5. *Vstore* | % | 114 | 1.00 |
| 6. *Vmacro* | no units | 6 | 1.00 |
| 7. *Vfreq* | years | 1 | 1.00 |
| 8. *Vrough* | no units | 0.145 | 1.00 |
| 9. *Vsoilint* | % | 0 | 1.00 |
| 10. *Vwtf* | p(1) / a(0) | 1 | 1.00 |
| 11. *Vwtd* | inches | 1 | 1.00 |
| 12. *Vwtslope* | % | 38 | 0.62 |
| 13. *Vsoilperm* | in/hr | 0.4 | 1.00 |
| 14. *Vpore* | % | 43 | 1.00 |
| 15. *Vsurfcon* | % | 67 | 0.33 |
| 16. *Vclay* | % | 0 | 1.00 |
| 17. *Vredox* | p(1) / a(0) | 1 | 1.00 |
| 18. *Vtba* | m2/ha | 40.25 | 1.00 |
| 19. *Vtden* | stems/ha | 425 | 1.00 |
| 20. *Vsnag* | stems/ha | 25 | 0.83 |
| 21. *Vwd* | m3/ha | 19.8 | 0.99 |
| 22. *Vlog* | m3/ha | 5.9 | 0.59 |
| 23. *Vssd* | stems/ha | 950 | 0.50 |
| 24. *Vgvc* | % | 20 | 1.00 |
| 25. *Vohor* | % | 98.8 | 1.00 |
| 26. *Vahor* | % | 100 | 1.00 |
| 27. *Vcomp* | % | 33.3 | 0.33 |

| FCI Function | 2017 |
|---|---|
| Temporarily Store Surface Water | 1.00 |
| Maintain Characteristic Subsurface Hydrology | 0.89 |
| Cycle Nutrients | 0.92 |
| Remove and Sequester Elements and Compounds | 1.00 |
| Retain Particulates | 1.00 |
| Export Organic Carbon | 0.76 |
| Maintain Characteristic Plant Community | 0.82 |
| Provide Habitat for Wildlife | 0.87 |
| **MEAN** | **0.91** |

Table 1. Functional Capacity Index scores for the Seven Hills Permit Area (May 2017)

| FCI Functions | 1A - PEM | 1B - PEM | 2 - PFO | | 3 - PFO | | 4 - PFO | | 5A - PSS | 5B - PSS |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2006 | 2017 | 2006 | 2017 | 2006 | 2017 | 2006 | 2017 | 2006 | 2017 |
| Temporarily Store Surface Water | 1.00 | 0.96 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Maintain Characteristic Subsurface Hydrology | 0.93 | 0.89 | 0.93 | 0.89 | 0.93 | 0.89 | 0.93 | 0.89 | 0.93 | 0.89 |
| Cycle Nutrients | 0.51 | 0.40 | 0.89 | 0.83 | 0.83 | 0.89 | 0.31 | 0.82 | 0.63 | 0.86 |
| Remove and Sequester Elements and Compounds | 0.91 | 0.97 | 0.99 | 1.00 | 0.95 | 1.00 | 0.87 | 1.00 | 0.96 | 1.00 |
| Retain Particulates | 1.00 | 0.96 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Export Organic Carbon | 0.00 | 0.46 | 0.56 | 0.76 | 0.69 | 0.66 | 0.62 | 0.67 | 0.71 | 0.76 |
| Maintain Characteristic Plant Community | 0.61 | 0.41 | 0.98 | 0.80 | 0.88 | 0.82 | 0.77 | 0.92 | 0.63 | 0.84 |
| Provide Habitat for Wildlife | 0.58 | 0.37 | 0.87 | 0.76 | 0.93 | 0.78 | 0.62 | 0.88 | 0.65 | 0.77 |
| **MEAN** | **0.69** | **0.68** | **0.90** | **0.88** | **0.90** | **0.88** | **0.76** | **0.90** | **0.81** | **0.89** |

| FCI Functions | 6 - PFO | | 7A - PSS | 7B - PSS | 8 - PSS | | 9 - PFO | | *10 - PFO | *11 - PFO |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2006 | 2017 | 2006 | 2017 | 2006 | 2017 | 2006 | 2017 | 2017 | 2017 |
| Temporarily Store Surface Water | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 |
| Maintain Characteristic Subsurface Hydrology | 0.93 | 0.89 | 0.93 | 0.89 | 0.93 | 0.89 | 0.93 | 0.89 | 0.89 | 0.89 |
| Cycle Nutrients | 0.91 | 0.94 | 0.51 | 0.55 | 0.42 | 0.66 | 0.85 | 0.95 | 0.92 | 0.92 |
| Remove and Sequester Elements and Compounds | 1.00 | 1.00 | 0.92 | 1.00 | 0.87 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 |
| Retain Particulates | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 |
| Export Organic Carbon | 0.00 | 0.69 | 0.00 | 0.54 | 0.00 | 0.65 | 0.00 | 0.76 | 0.76 | 0.76 |
| Maintain Characteristic Plant Community | 0.82 | 0.85 | 0.66 | 0.44 | 0.00 | 0.00 | 0.93 | 1.00 | 0.90 | 0.82 |
| Provide Habitat for Wildlife | 0.80 | 0.91 | 0.76 | 0.43 | 0.34 | 0.43 | 0.84 | 0.96 | 0.79 | 0.87 |
| **MEAN** | **0.81** | **0.91** | **0.72** | **0.73** | **0.57** | **0.70** | **0.82** | **0.95** | **0.91** | **0.91** |

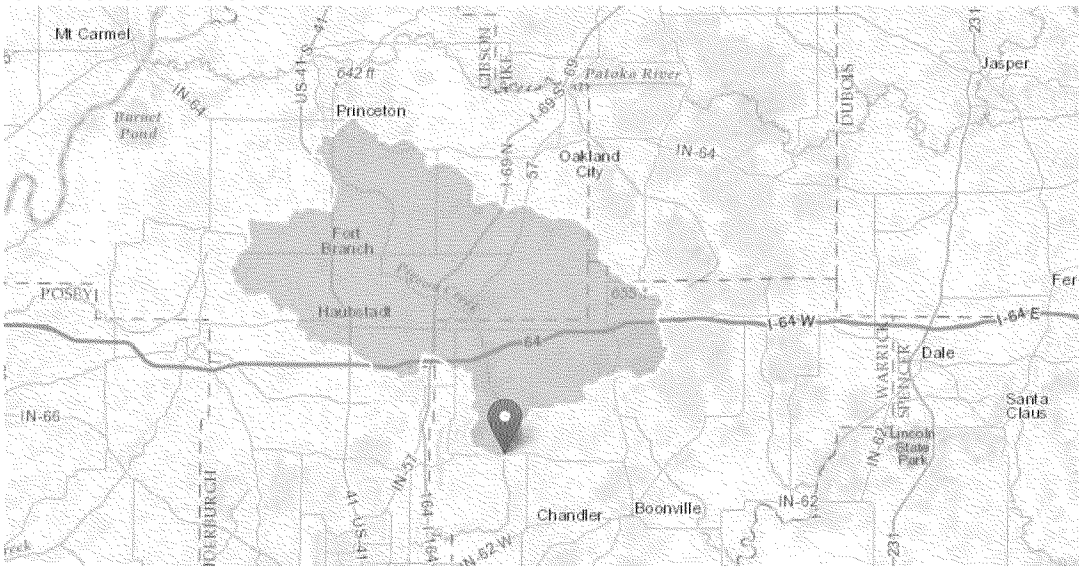
| | |
|---|---|
| Aggregate Mean Index 2006 | 0.776 |
| Aggregate Mean Index 2017 | 0.834 |
| Difference | 0.058 |
| Percent Change | 7.5% |

* - Additional 2017 HGM plot assessed in estimated 80+ year old forest community.


105+00
100+00
95+00
90+00

# StreamStats Report

**Region ID:**
IN
**Workspace ID:**
IN20170508134044798000
**Clicked Point (Latitude, Longitude):**
38.09658, -87.39925
**Time:**
2017-05-08 15:44:12 -0400




Basin Characteristics

| Parameter Code | Parameter Description | Value | Unit |
|---|---|---|---|
| DRNAREA | Area that drains to a point on a stream | 207.85 | square miles |
| BFREGNO | | 1567 | |

Bankfull Statistics Parameters [100 Percent (208 square miles) Bankfull South Hills and Lowlands Region 2013 5078]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|---|---|---|---|---|---|
| DRNAREA | Drainage Area | 207.85 | square miles | 0.06 | 186 |
| BFREGNO | BFREGNO | 1567 | dimensionless | | |

Bankfull Statistics Disclaimers [100 Percent (208 square miles) Bankfull South Hills and Lowlands Region 2013 5078]

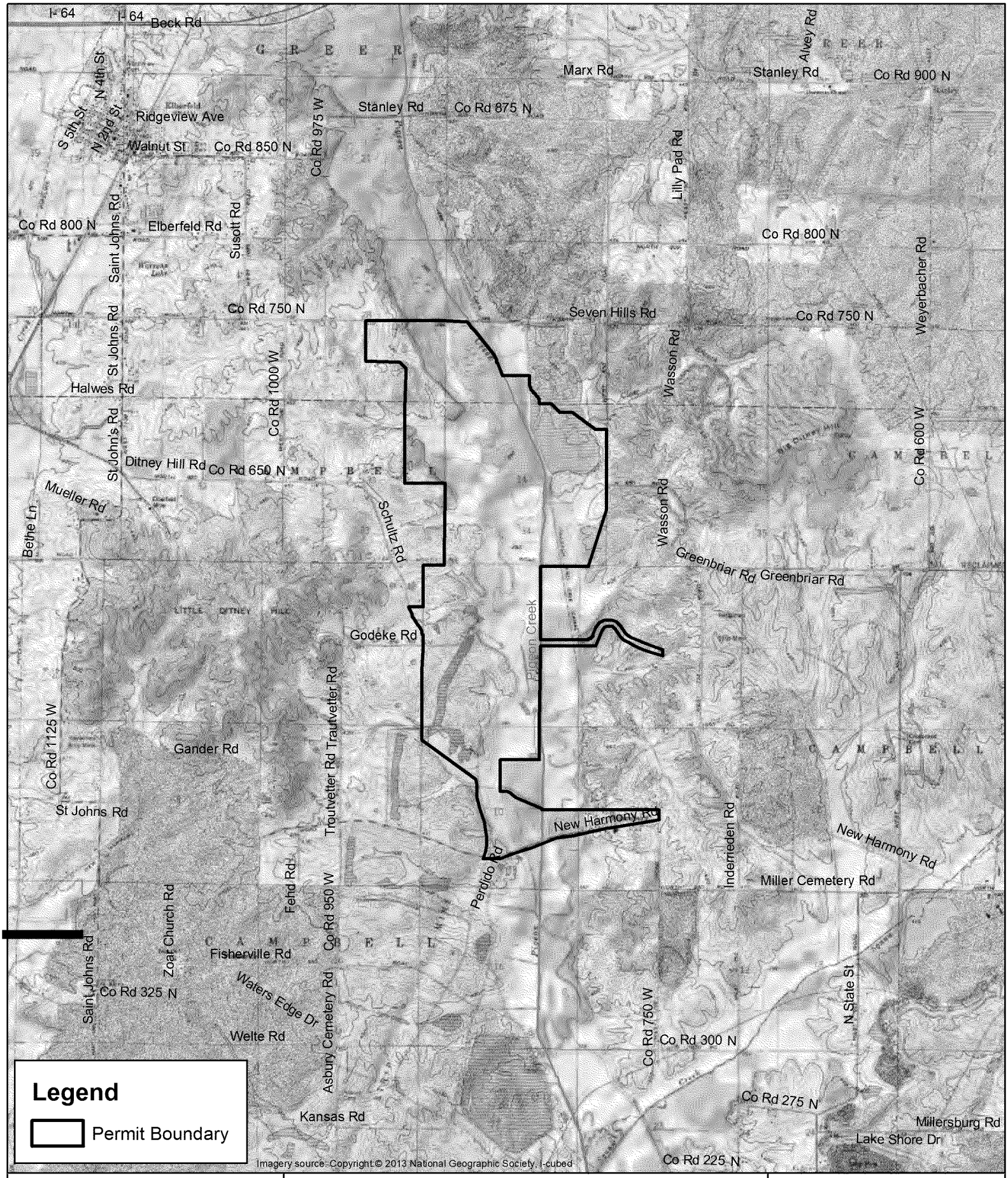
One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Bankfull Statistics Flow Report [100 Percent (208 square miles) Bankfull South Hills and Lowlands Region 2013 5078]

| Statistic | Value | Unit |
|---|---|---|
| Bankfull Width | 125 | ft |
| Bankfull Depth | 5.05 | ft |
| Bankfull Area | 619 | ft^2 |

Bankfull Statistics Citations

**Robinson, B.A.,2013, Regional bankfull-channel dimensions of non-urban wadeable streams in Indiana: U.S. Geological Survey, Scientific Investigations Report 2013–5078, 33 p. (http://pubs.usgs.gov/sir/2013/5078/)**




**Seven Hills Mine**
**Peabody Energy**
**Warrick County, Indiana**

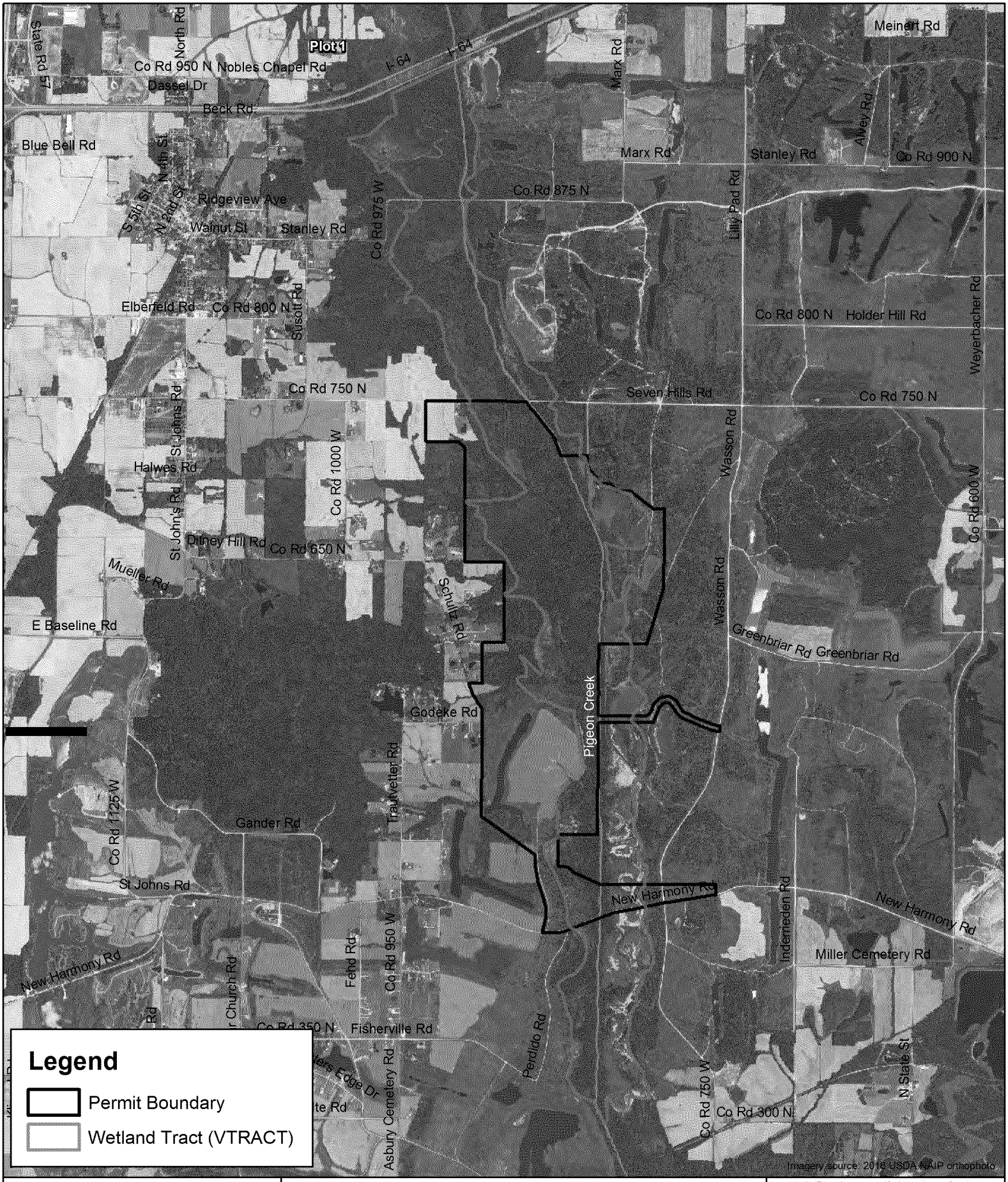
0 0.5 1 Miles

# FIGURE 1. SEVEN HILLS MINE LOCATION MAP

Eco-Tech CONSULTANTS

Drawn by: RRN | Print date: 4/11/2017

ETC File: LV2017009



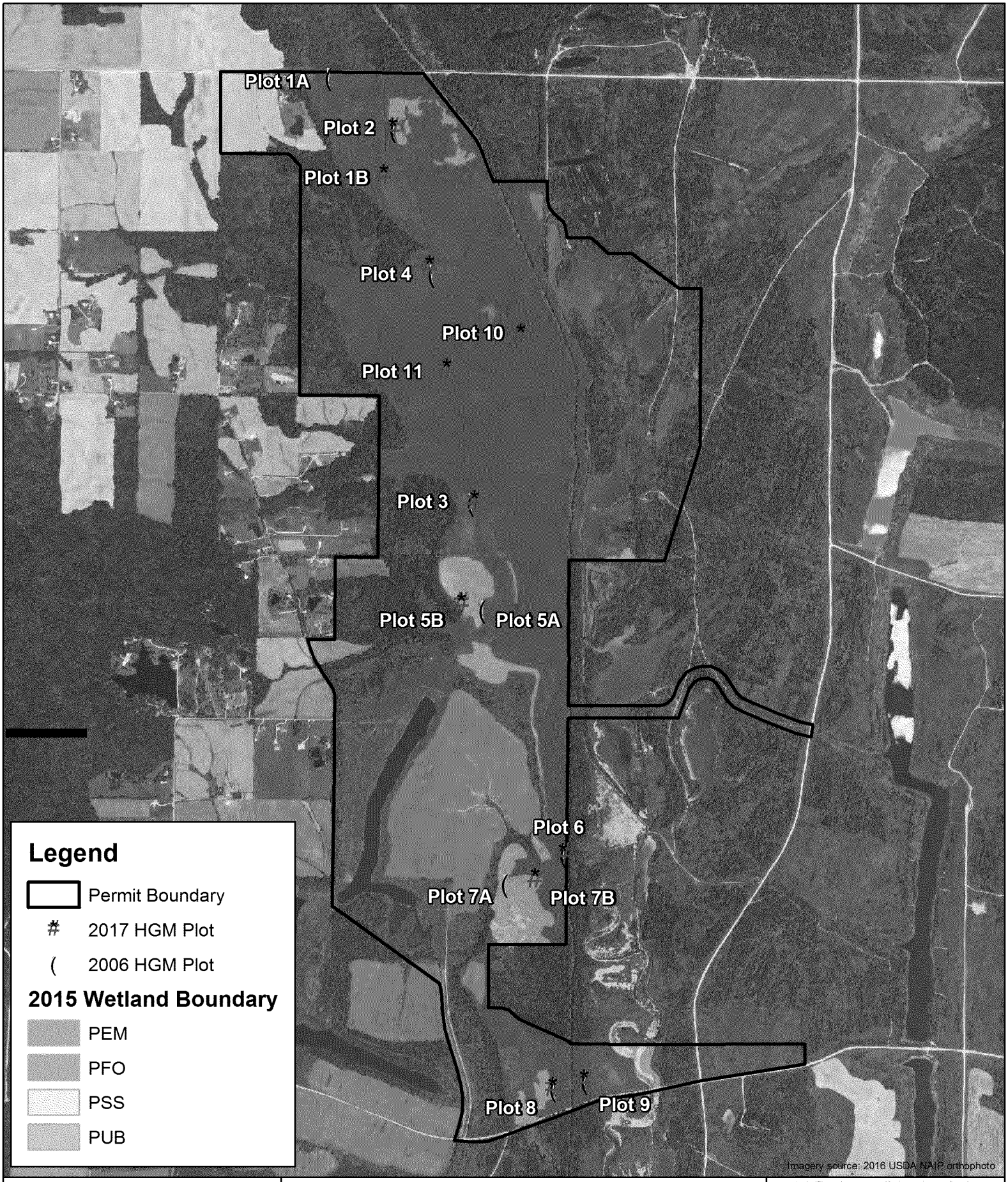

**Seven Hills Mine**
**Peabody Energy**
**Warrick County, Indiana**

0 2,050 4,100
Feet

# FIGURE 2. LOCATION OF HGM VTRACT

Eco-Tech CONSULTANTS

| Drawn by: RRN | Print date: 5/12/2017 |
|---|---|
| ETC File: LV2017009 | |




**Seven Hills Mine**
**Peabody Energy**
**Warrick County, Indiana**

0 1,000 2,000 Feet

# FIGURE 3. LOCATION OF HGM ASSESSMENT SITES

Eco-Tech CONSULTANTS

Drawn by: RRN | Print date: 5/12/2017

ETC File: LV2017009

PEM

# Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A+TEAM
**Project Name/Location:** 7 HILLS - PLOT 1B **Date :** 4-6-2017

**Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.**

1. $V_{TRACT}$ Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha
2. $V_{CORE}$ Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %
3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %
4. $V_{SLOPE}$ Percent floodplain slope ..... 6' ÷ 17,525 (VL) = 0.03 ..... 0.03 %
5. $V_{STORE}$ Floodplain width to channel width ratio ..... 4286/50 ..... 85
6. $V_{MACRO}$ Percent of WAA covered with macrotopographic features ..... 6 %

**Sample variables 7-17 based on a walking reconnaissance of the WAA**

7. $V_{FREQ}$ Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____ .
8. $V_{ROUGH}$ Roughness Coefficient .03($n_{BASE}$) + .005($n_{TOPO}$) + .002($n_{OBS}$) + .05($n_{VEG}$) = ..... 0.087
9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.
10. $V_{WTF}$ Water table fluctuation is (check one): ..... present ✓ absent _____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
11. $V_{WTD}$ Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey ✓.
12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %
13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)
14. $V_{PORE}$ Percent effective soil porosity ..... 43 %
15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 67 %
16. $V_{CLAY}$ Percent of WAA with altered clay content in soil profile SILTY CLAY ..... 0 %
    50% CLAY
17. $V_{REDOX}$ Redoximorphic features are (check one): ..... present ✓ absent _____

PLOT 1B

**Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)**

1-0.04 ha plot Sampled

18. $V_{TBA}$ Tree basal area (average of 0.04 ha plot values on next line) . . . . . 0 $m^2$/ha
0.04 ha plots: 1 0 $m^2$/ha 2 ____ $m^2$/ha 3 ____ $m^2$/ha 4 ____ $m^2$/ha

19. $V_{TDEN}$ Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 0 stems / ha
0.04 ha plots: 1 0 stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. $V_{SNAG}$ Number of snags (average of 0.04 ha plot values on next line) . . . . . 0 stems / ha
0.04 ha plots: 1 0 stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot**

2-15 m transects sampled

21. $V_{WD}$ Volume of woody debris (average of transect values on next line) . . . . . 0 $m^3$/ha
Transect: 1 0 $m^3$/ha 2 0 $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

22. $V_{LOG}$ Volume of logs (average of transect values on next line) . . . . . 0 $m^3$/ha
Transect: 1 0 $m^3$/ha 2 0 $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

**Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot**

1-0.04 ha plot Sampled

23. $V_{SSD}$ Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 850 stems / ha
0.04 ha plots: 1 850 stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 24-26 in four (4) $m^2$ subplots placed in representative locations of each quadrant of the 0.04 ha plot**

24. $V_{GVC}$ Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 97.5 %
Average of 0.04 ha plots sampled: 1 95 % 2 100 % 3 95 % 4 100 %

25. $V_{OHOR}$ Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 45 %
Average of 0.04 ha plots sampled: 1 50 % 2 75 % 3 15 % 4 40 %

26. $V_{AHOR}$ Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
Average of 0.04 ha plots sampled: 1 100 % 2 100 % 3 100 % 4 100 %

27. $V_{COMP}$ Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 33 %
Average of 0.04 ha plots sampled: 1 33 % 2 ____ % 3 ____ % 4 ____ %

1-0.04 ha plot Sampled For Tree/shrub/sapling

★ 1m² plots Sampled For ground vegetation.

PEM

# Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A-TEAM

**Project Name/Location :** 7HILLS **Plot Number :** 1B **Date :** 4-6-2017

Record dbh (cm) of trees by species below, square dbh values ($cm^2$), multiply result by 0.000079 ($m^2$), and sum resulting values in shaded columns ($m^2$/0.04 ha). Record in 18. $V_{TBA}$, multiply by 25 ($m^2$/ha).

| Species | dbh (cm) | dbh$^2$ ($cm^2$) | × 0.00079 ($m^2$/0.04 ha) | Species | dbh (cm) | dbh$^2$ ($cm^2$) | × 0.00079 ($m^2$/0.04 ha) |
|---|---|---|---|---|---|---|---|
| None | | | | | | | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |

**18.** $V_{TBA}$ Sum of values from shaded columns above = 0 ($m^2$/0.04 ha) × 25 = 0 $m^2$/ha

**19.** $V_{TDEN}$ Total number of tree stems from above = 0 (stems/0.04 ha) × 25 = 0 stems/ha

**20.** $V_{SNAG}$ Total number of snag stems from above= 0 (stems/0.04 ha) × 25 = 0 stems/ha

**21/22.** $V_{WD}$ /$V_{LOG}$

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 0 Transect 2 0 *Total number of stems* = 0

**Size Class 1** tons /acre = 0.187 × *total number of stems* = . . . . . 0 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 0 Transect 2 0 *Total number of stems* = 0

**Size Class 2** tons / acre = 0.892 × *total number of stems* = . . . . . 0 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

| Transect 1 | diameter | diameter$^2$ | Transect 2 | diameter | diameter$^2$ |
|---|---|---|---|---|---|
| Stem 1 = | 0 | – | Stem 1 = | 0 | – |
| Stem 2 = | | | Stem 2 = | | |
| Stem 3 = | | | Stem 3 = | | |
| Stem 4 = | | | Stem 4 = | | |
| Total diameter$^2$ | | | Total diameter$^2$ | | |

*Total diameter$^2$ of stems from both transects* = 0

PLOT 1B

**Size Class 3** tons / acre = 0.0687 × *Total diameter² of stems from both transects* = . 0 tons/acre
*Total tons / acre* (sum of Size Classes 1-3 from above) = ..... 0 tons/acre
*Cubic feet / acre* = (32.05 × *total tons / acre*) / 0.58 = ..... 0 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 ..... 0 cubic meters/ha

**23.** $V_{SSD}$ Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
Subplot 1 IIII IIII IIII IIII II Subplot 2 IIII IIII IIII IIII IIII Average 34 × 250 = . 850 stems/ha
104 SAMPLE

**24.** $V_{GVC}$ Estimate percent cover of ground vegetation in four m² subplots then average:
1 95 % 2 100 % 3 95 % 4 100 % ..... Average 97.5 %

**25.** $V_{OHOR}$ Estimate percent cover of "O" Horizon in four m² subplots then average:
1 50 % 2 75 % 3 15 % 4 40 % ..... Average 45 %

**26.** $V_{AHOR}$ Estimate percent cover of "A" Horizon in four m² subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % ..... Average 100 %

**27.** $V_{COMP}$ Determine percent concurrence with each strata using the table below
Tree = 0 % Shrub/Sapling = 100 % Ground Vegetation = 0 % .... Average 33 %

| Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands | | |
|---|---|---|
| Tree | Shrub/Sapling | Ground Vegetation |
| *Acer rubrum* | *Acer rubrum* | *Arundinaria gigantea* |
| *Betula nigra* | *Betula nigra* | *Aster* sp. 15/20/30/30 |
| *Carya laciniosa* | *Carya laciniosa* | *Boehmaria dylindrica* |
| *Celtis laevigata* | *Carpinus caroliniana* | *Campsis radicans* |
| *Fraxinus pennsylvanica* | *Celtis laevigata* | *Carex squarosa* |
| *Liquidambar styraciflua* | *Celtis occidentalis* | *Eragrostis alba* |
| *Quercus pagodifolia* | *Fraxinus pennsylvanica* ☒ | *Glyceria striata* |
| *Quercus phellos* | *Ilex decidua* | *Hypericum* sp. |
| *Quercus lyrata* | *Liquidambar styraciflua* | *Impatiens capensis* |
| *Quercus imbricaria* | *Nyssa sylvatica* | *Panicum* sp. |
| *Quercus michauxii* | *Quercus imbricaria* | *Parthenocissus quinquefolia* |
| *Quercus stellata* | *Quercus lyrata* | *Pilea pumila* |
| *Quercus palustris* | *Quercus phellos* | *Quercus phellos* |
| *Salix nigra* | *Quercus palustris* | *Salix nigra* |
| | *Quercus pagodifolia* | *Saurarus cernuus* |
| | *Quercus stellata* | *Smilacina racemosa* |
| | *Platanus occidentalis* | *Smilax rotundifolia* |
| | *Salix nigra* ☒ | *Sparganium* sp. |
| | *Ulmus americana* | *Toxicodendron radicans* |

BLACK WILLOW
SILVER MAPLE

✓14 GRASS 41%
✓11 BLACK WILLOW 32%
27%

DOMINANT
REED CANARY GRASS 30% ✓
CAREX VULPINOIDEA 10%
CREEPING JENNY 40% ✓
ASTER SP. 15%
CAREX FRANKII 5%

PFO

# Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A-TEAM
**Project Name/Location:** 7 HILLS | PLOT 2 **Date :** 4-5-2017

**Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.**

1. $V_{TRACT}$ Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha
2. $V_{CORE}$ Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %
3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %
4. $V_{SLOPE}$ Percent floodplain slope ..... 0.03 %
5. $V_{STORE}$ Floodplain width to channel width ratio ....3412/50..... 68
6. $V_{MACRO}$ Percent of WAA covered with macrotopographic features ..... 6 %

**Sample variables 7-17 based on a walking reconnaissance of the WAA**

7. $V_{FREQ}$ Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____ .
8. $V_{ROUGH}$ Roughness Coefficient 0.03 $(n_{BASE})$ + .005 $(n_{TOPO})$ + .002 $(n_{OBS})$ + .15 $(n_{VEG})$ = ..... 0.187
9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.
10. $V_{WTF}$ Water table fluctuation is (check one): ..... present ✓ absent ____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
11. $V_{WTD}$ Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey ✓.
12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %
13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)
14. $V_{PORE}$ Percent effective soil porosity ..... 43 %
15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 67 %
16. $V_{CLAY}$ Percent of WAA with altered clay content in soil profile SILTY CLAY ..... 0 %
17. $V_{REDOX}$ Redoximorphic features are (check one): ..... present ✓ absent ____

PLOT 2

**Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)**

18. $V_{TBA}$ Tree basal area (average of 0.04 ha plot values on next line) . . . . . 10,925 $m^2$/ha
    0.04 ha plots: 1 ____ $m^2$/ha 2 ____ $m^2$/ha 3 ____ $m^2$/ha 4 ____ $m^2$/ha

1-0.04 ha plot sampled

19. $V_{TDEN}$ Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 600 stems / ha
    0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. $V_{SNAG}$ Number of snags (average of 0.04 ha plot values on next line) . . . . . 0 stems / ha
    0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot**

21. $V_{WD}$ Volume of woody debris (average of transect values on next line) . . . . . 37.4 $m^3$/ha
    Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

2-15 m transects Sampled

22. $V_{LOG}$ Volume of logs (average of transect values on next line) . . . . . 29,856 $m^3$/ha
    Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

**Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot**

1-0.04 ha plot Sampled

23. $V_{SSD}$ Number of woody understory stems (average of 0.04 ha plot values on next line)
    . . . . . 1325 stems / ha
    0.04 ha plots: 1 1325 stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 24-26 in four (4) $m^2$ subplots placed in representative locations of each quadrant of the 0.04 ha plot**

24. $V_{GVC}$ Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 28 %
    Average of 0.04 ha plots sampled: 1 40 % 2 23 % 3 30 % 4 20 %

25. $V_{OHOR}$ Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
    Average of 0.04 ha plots sampled: 1 100 % 2 100 % 3 100 % 4 100 %

26. $V_{AHOR}$ Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
    Average of 0.04 ha plots sampled: 1 100 % 2 100 % 3 100 % 4 100 %

27. $V_{COMP}$ Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 50 %
    Average of 0.04 ha plots sampled: 1 50 % 2 ____ % 3 ____ % 4 ____ %

1-0.04 ha plot sampled for trees, shrub/saplings ☆ 1 $m^2$ plots sampled for ground vegetation.

# Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A-TEAM

**Project Name/Location :** 7 HILLS **Plot Number :** 2 **Date :** 4-5-2017

Record dbh (cm) of trees by species below, square dbh values ($cm^2$), multiply result by 0.000079 ($m^2$), and sum resulting values in shaded columns ($m^2$/0.04 ha). Record in 18. $V_{TBA}$, multiply by 25 ($m^2$/ha).

IN.

| Species | dbh (cm) | dbh² (cm²) | × 0.00079 (m²/0.04 ha) | Species | dbh (cm) | dbh² (cm²) | × 0.00079 (m²/0.04 ha) |
|---|---|---|---|---|---|---|---|
| BL. WILLOW | 4.9 | | | BL. WILLOW | 5.7 | | |
| BL. WILLOW | 5.6 | | | AM. ELM | 5.8 | ✓ | |
| BL. WILLOW | 4.0 | | | R. MAPLE | 10.0 | ✓ | |
| BL. WILLOW | 5.3 | | | BL. WILLOW | 5.1 | | |
| GR. ASH | 5.4 | ✓ | | BL. WILLOW | 4.9 | | |
| BOX ELDER | 8.9 | | | BL. WILLOW | 4.4 | | |
| SILVER M. | 8.8 | ✓ | | BL. WILLOW | 3.9 | | |
| SILVER M. | 9.1 | ✓ | | BL. WILLOW | 4.0 | | |
| SILVER M | 5.7 | ✓ | | BL. WILLOW | 4.3 | | |
| GR. ASH | 4.1 | ✓ | | BL. WILLOW | 4.4 | | |
| GR. ASH | 8.8 | ✓ | | BL. WILLOW | 4.5 | | |
| BL. WILLOW | 4.4 | | | BL. WILLOW | 4.2 | | |

**18.** $V_{TBA}$ Sum of values from shaded columns above = 0.437 ($m^2$/0.04 ha) × 25 = 10.925 $m^2$/ha

**19.** $V_{TDEN}$ Total number of tree stems from above = 24 (stems/0.04 ha) × 25 = 600 stems/ha

**20.** $V_{SNAG}$ Total number of snag stems from above= 0 (stems/0.04 ha) × 25 = 0 stems/ha

**21/22.** $V_{WD}$ /$V_{LOG}$

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 _____ Transect 2 _____ *Total number of stems* = 1

**Size Class 1** tons /acre = 0.187 × *total number of stems* = ..... 0.2 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 _____ Transect 2 _____ *Total number of stems* = 2

**Size Class 2** tons / acre = 0.892 × *total number of stems* = ..... 1.8 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

| Transect 1 | diameter | diameter² | Transect 2 | diameter | diameter² |
|---|---|---|---|---|---|
| Stem 1 = | 4.0 | 16 | Stem 1 = | 4.9 | 24.01 |
| Stem 2 = | | | Stem 2 = | 3.4 | 11.56 |
| Stem 3 = | | | Stem 3 = | 7.9 | 62.41 |
| Stem 4 = | | | Stem 4 = | | |
| Total diameter² | | 16 | Total diameter² | | 98 |

*Total diameter² of stems from both transects* = 114

PLOT 2

**Size Class 3** tons / acre = 0.0687 × *Total diameter² of stems from both transects* = . 7.8 tons/acre
*Total tons / acre* (sum of Size Classes 1-3 from above) = . . . . . 9.8 tons/acre
*Cubic feet / acre* = (32.05 × *total tons / acre*) / 0.58 = . . . . . 541.5 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 . . . . . 37.4 cubic meters/ha $V_{WO}$

**23.** $V_{SSD}$ Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
104 SAMPLE
~~Subplot~~ 1 ~~IIII IIII IIII~~ ~~Subplot~~ 2 ~~III~~ IIII IIII IIII IIII IIII IIII IIII Average 53 × 250 = . 1325 stems/ha

**24.** $V_{GVC}$ Estimate percent cover of ground vegetation in four m² subplots then average:
1 40 % 2 23 % 3 30 % 4 20 % . . . . . Average 28 %

**25.** $V_{OHOR}$ Estimate percent cover of "O" Horizon in four m² subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % . . . . . Average 100 %

**26.** $V_{AHOR}$ Estimate percent cover of "A" Horizon in four m² subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % . . . . . Average 100 %

**27.** $V_{COMP}$ Determine percent concurrence with each strata using the table below
Tree = 50 % Shrub/Sapling = 100 % Ground Vegetation = 0 % . . . . Average 50 %

| Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands | | |
|---|---|---|
| Tree | Shrub/Sapling | Ground Vegetation |
| *Acer rubrum* | *Acer rubrum* | *Arundinaria gigantea* |
| *Betula nigra* | *Betula nigra* | *Aster* sp. |
| *Carya laciniosa* | *Carya laciniosa* | *Boehmaria cylindrica* |
| *Celtis laevigata* | *Carpinus caroliniana* | *Campsis radicans* |
| *Fraxinus pennsylvanica* | *Celtis laevigata* | *Carex squarosa* |
| *Liquidambar styraciflua* | *Celtis occidentalis* | *Eragrostis alba* |
| *Quercus pagodifolia* | *Fraxinus pennsylvanica* | *Glyceria striata* |
| *Quercus phellos* | ~~*Ilex decidua*~~ F. | *Hypericum* sp. |
| *Quercus lyrata* | *Liquidambar styraciflua* | *Impatiens capensis* |
| *Quercus imbricaria* | *Nyssa sylvatica* | *Panicum* sp. |
| *Quercus michauxii* | *Quercus imbricaria* | *Parthenocissus quinquefolia* |
| *Quercus stellata* | *Quercus lyrata* | *Pilea pumila* |
| *Quercus palustris* | *Quercus phellos* | *Quercus phellos* |
| *Salix nigra* ✓ | *Quercus palustris* | *Salix nigra* |
| | *Quercus pagodifolia* | *Saurauris cernuus* |
| | *Quercus stellata* | *Smilacina racemosa* |
| | *Platanus occidentalis* | *Smilax rotundifolia* |
| | *Salix nigra* | *Sparganium* sp. |
| | *Ulmus americana* | *Toxicodendron radicans* |

0.437
20% = 0.087

✓BL. WILLOW 0.167 38%
✓SILVER MAPLE 0.098 22%
GR. ASH 0.063 14%
RED MAPLE 0.051
BOX ELDER 0.04
AM ELM 0.017

✓GR ASH 26 49%
✓BL WILLOW 6 11%
AM ELM 3 5%

CAREX SP. 25%
CREEPING JENNY 10%
RUMEX SP. 1%

***Basal Area - PLOT 2***

| dbh (in) | dbh (cm) | cm² | x .000079 |
|---|---|---|---|
| 4.9 | 12.446 | 154.903 | 0.012 |
| 5.6 | 14.224 | 202.322 | 0.016 |
| 4.0 | 10.160 | 103.226 | 0.008 |
| 5.3 | 13.462 | 181.225 | 0.014 |
| 5.4 | 13.716 | 188.129 | 0.015 |
| 8.9 | 22.606 | 511.031 | 0.040 |
| 8.8 | 22.352 | 499.612 | 0.039 |
| 9.1 | 23.114 | 534.257 | 0.042 |
| 5.7 | 14.478 | 209.612 | 0.017 |
| 4.1 | 10.414 | 108.451 | 0.009 |
| 8.8 | 22.352 | 499.612 | 0.039 |
| 4.4 | 11.176 | 124.903 | 0.010 |
| 5.7 | 14.478 | 209.612 | 0.017 |
| 5.8 | 14.732 | 217.032 | 0.017 |
| 10.0 | 25.400 | 645.160 | 0.051 |
| 5.1 | 12.954 | 167.806 | 0.013 |
| 4.9 | 12.446 | 154.903 | 0.012 |
| 4.4 | 11.176 | 124.903 | 0.010 |
| 3.9 | 9.906 | 98.129 | 0.008 |
| 4.0 | 10.160 | 103.226 | 0.008 |
| 4.3 | 10.922 | 119.290 | 0.009 |
| 4.4 | 11.176 | 124.903 | 0.010 |
| 4.5 | 11.430 | 130.645 | 0.010 |
| 4.2 | 10.668 | 113.806 | 0.009 |
| | | **Total** | **0.437** |

PFO

# Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A-Team
**Project Name/Location:** 7 HILLS PLOT 3 **Date :** 4-6-2017

**Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.**

1. $V_{TRACT}$ Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha
2. $V_{CORE}$ Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %
3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %
4. $V_{SLOPE}$ Percent floodplain slope ..... 0.03 %
5. $V_{STORE}$ Floodplain width to channel width ratio ... 3198/50 ..... 64
6. $V_{MACRO}$ Percent of WAA covered with macrotopographic features ..... 6 %

**Sample variables 7-17 based on a walking reconnaissance of the WAA**

7. $V_{FREQ}$ Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____.
8. $V_{ROUGH}$ Roughness Coefficient .03 $(n_{BASE})$ + .005 $(n_{TOPO})$ + 0.025 $(n_{OBS})$ + .01 $(n_{VEG})$ = ..... 0.16
9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.
10. $V_{WTF}$ Water table fluctuation is (check one): ..... present ✓ absent ____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
11. $V_{WTD}$ Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey ✓.
12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %
13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)
14. $V_{PORE}$ Percent effective soil porosity ..... 43 %
15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 67 %
16. $V_{CLAY}$ Percent of WAA with altered clay content in soil profile ..... SILTY CLAY ..... 0 %
17. $V_{REDOX}$ Redoximorphic features are (check one): ..... present ✓ absent ____

PLOT 3

**Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)**

1-0.04 ha plot Sampled

18. $V_{TBA}$ Tree basal area (average of 0.04 ha plot values on next line) . . . . . 40.63 $m^2$/ha
0.04 ha plots: 1 ____ $m^2$/ha 2 ____ $m^2$/ha 3 ____ $m^2$/ha 4 ____ $m^2$/ha

19. $V_{TDEN}$ Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 760 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. $V_{SNAG}$ Number of snags (average of 0.04 ha plot values on next line) . . . . . 100 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot**

2-15m transects Sampled

21. $V_{WD}$ Volume of woody debris (average of transect values on next line) . . . . . 10.3 $m^3$/ha
Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

22. $V_{LOG}$ Volume of logs (average of transect values on next line) . . . . . 6.2 $m^3$/ha
Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

**Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot**

1-0.04 ha plot Sampled

23. $V_{SSD}$ Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 250 stems / ha
0.04 ha plots: 1 250 stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 24-26 in four (4) $m^2$ subplots placed in representative locations of each quadrant of the 0.04 ha plot**

24. $V_{GVC}$ Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 28 %
Average of 0.04 ha plots sampled: 1 85 % 2 2 % 3 7 % 4 60 %

25. $V_{OHOR}$ Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 95 %
Average of 0.04 ha plots sampled: 1 85 % 2 95 % 3 100 % 4 100 %

26. $V_{AHOR}$ Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
Average of 0.04 ha plots sampled: 1 100 % 2 100 % 3 100 % 4 100 %

27. $V_{COMP}$ Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 33 %
Average of 0.04 ha plots sampled: 1 33 % 2 ____ % 3 ____ % 4 ____ %

1-0.04 ha plot Sampled for trees / shrub/sapling
* 1 $m^2$ plots sampled for ground vegetation

# Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A-Team

**Project Name/Location :** 7 HILLS **Plot Number :** 3 **Date :** 4-6-2017

Record dbh (cm) of trees by species below, square dbh values ($cm^2$), multiply result by 0.000079 ($m^2$), and sum resulting values in shaded columns ($m^2$/0.04 ha). Record in 18. $V_{TBA}$, multiply by 25 ($m^2$/ha).

IN.

| Species | dbh (cm) | dbh² (cm²) | × 0.00079 (m²/0.04 ha) | Species | dbh (cm) | dbh² (cm²) | × 0.00079 (m²/0.04 ha) |
|---|---|---|---|---|---|---|---|
| GR ASH | 11 ✓ | | | PIN OAK | 10.1 | | |
| GR ASH | 9.4 ✓ | | | SILVER M | 10.4 | | |
| CARYA SP. | 4.1 ✓ | | | SILVER M | 4.4 | | |
| SWEETGUM | 17.5 ✓ | | | AM. ELM | 7.3 | | |
| BOX ELDER | 8.5 ✓ | | | SW. GUM | 5.2 ✓ | | |
| GR. ASH | 8.4 ✓ | | | SW. GUM | 21.3 ✓ | | |
| AM ELM | 5.0 ✓ | | | SW. GUM | 4.4 ✓ | | |
| SW. GUM | 7.9 ✓ | | | R. BIRCH | 13.3 | | |
| SW. GUM | 15 ✓ | | | SW. GUM | 9.9 ✓ | | |
| IRONWOOD | 4.5 ✓ | | | Q. MICHAUXII | 4.1 | | |
| SW. GUM | 20.4 ✓ | | | AM. ELM | 4.5 ✓ | | |
| SILVER M | 13.2 | | | SW. GUM | 14.5 ✓ | | |

**18.** $V_{TBA}$ Sum of values from shaded columns above = 1.625 ($m^2$/0.04 ha) × 25 = 40.63 $m^2$/ha

**19.** $V_{TDEN}$ Total number of tree stems from above = 28 (stems/0.04 ha) × 25 = 700 stems/ha

**20.** $V_{SNAG}$ Total number of snag stems from above= ... (stems/0.04 ha) × 25 = 100 stems/ha

**21/22.** $V_{WD}$ /$V_{LOG}$

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 _____ Transect 2 * *Total number of stems* = 1

**Size Class 1** tons /acre = 0.187 × *total number of stems* = ..... 0.2 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 _____ Transect 2 * *Total number of stems* = 1

**Size Class 2** tons / acre = 0.892 × *total number of stems* = ..... 0.9 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

| Transect 1 | diameter | diameter² | Transect 2 | diameter | diameter² |
|---|---|---|---|---|---|
| Stem 1 = | 3.4 | 11.56 | Stem 1 = | 3.5 | 12.25 |
| Stem 2 = | | | Stem 2 = | | |
| Stem 3 = | | | Stem 3 = | | |
| Stem 4 = | | | Stem 4 = | | |
| Total diameter² | | 11.56 | Total diameter ² | | 12.25 |

*Total diameter² of stems from both transects* = 23.8

SW. GUM - 11 | 9.7 | 7.0

AM. ELM - 4.6

PLOT 3

**Size Class 3** tons / acre = 0.0687 × *Total diameter² of stems from both transects* = . 1.6 tons/acre
*Total tons / acre* (sum of Size Classes 1-3 from above) = ..... 2.7 tons/acre
*Cubic feet / acre* = (32.05 × *total tons / acre*) / 0.58 = ..... 149.2 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 ..... 10.3 cubic meters/ha $V_{WO}$

**23.** $V_{SSD}$ Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
1 SAMPLE ~~Subplot 1~~ IIII IIII ~~Subplot 2~~ _____ Average 10 × 250 = . 250 stems/ha

**24.** $V_{GVC}$ Estimate percent cover of ground vegetation in four m² subplots then average:
1 85 % 2 2 % 3 7 % 4 60 % ..... Average 38 %

**25.** $V_{OHOR}$ Estimate percent cover of "O" Horizon in four m² subplots then average:
1 85 % 2 95 % 3 100 % 4 100 % ..... Average 95 %

**26.** $V_{AHOR}$ Estimate percent cover of "A" Horizon in four m² subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % ..... Average 0 %

**27.** $V_{COMP}$ Determine percent concurrence with each strata using the table below
Tree = 100 % Shrub/Sapling = 0 % Ground Vegetation = 0 % .... Average 33 %

| Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands | | |
|---|---|---|
| Tree | Shrub/Sapling | Ground Vegetation |
| *Acer rubrum* | *Acer rubrum* | *Arundinaria gigantea* |
| *Betula nigra* | *Betula nigra* | *Aster* sp. ✓ |
| *Carya laciniosa* | *Carya laciniosa* | *Boehmaria cylindrica* |
| *Celtis laevigata* | *Carpinus caroliniana* | *Campsis radicans* ✓ |
| *Fraxinus pennsylvanica* | *Celtis laevigata* | *Carex squarosa* |
| *Liquidambar styraciflua* ✓ | *Celtis occidentalis* | *Eragrostis alba* |
| *Quercus pagodifolia* | *Fraxinus pennsylvanica* | *Glyceria striata* |
| *Quercus phellos* | *Ilex decidua* | *Hypericum* sp. |
| *Quercus lyrata* | *Liquidambar styraciflua* | *Impatiens capensis* |
| *Quercus imbricaria* | *Nyssa sylvatica* | *Panicum* sp. |
| *Quercus michauxii* | *Quercus imbricaria* | *Parthenocissus quinquefolia* |
| *Quercus stellata* | *Quercus lyrata* | *Pilea pumila* |
| *Quercus palustris* | *Quercus phellos* | *Quercus phellos* |
| *Salix nigra* | *Quercus palustris* | *Salix nigra* |
| | *Quercus pagodifolia* | *Sauraurus cernuus* |
| | *Quercus stellata* | *Smilacina racemosa* |
| | *Platanus occidentalis* | *Smilax rotundifolia* |
| | *Salix nigra* | *Sparganium* sp. |
| | *Ulmus americana* | *Toxicodendron radicans* ✓ |

1.625
20%-0.325

SWEETGUM 0.959 59%

ILEX 10%
SWEETGUM 10%
ULMUS AM. 10%

CREEPING JENNY 75% ✓
CAREX SP. 1%
ASTER SP. 4%
RANCUNCUS SP. 5%

***Basal Area - PLOT 3***

| dbh (in) | dbh (cm) | cm² | x .000079 |
|---|---|---|---|
| 11.0 | 27.940 | 780.644 | 0.062 |
| 9.4 | 23.876 | 570.063 | 0.045 |
| 4.1 | 10.414 | 108.451 | 0.009 |
| 17.5 | 44.450 | 1975.803 | 0.156 |
| 8.5 | 21.590 | 466.128 | 0.037 |
| 8.4 | 21.336 | 455.225 | 0.036 |
| 5.0 | 12.700 | 161.290 | 0.013 |
| 7.9 | 20.066 | 402.644 | 0.032 |
| 15.0 | 38.100 | 1451.610 | 0.115 |
| 4.5 | 11.430 | 130.645 | 0.010 |
| 20.4 | 51.816 | 2684.898 | 0.212 |
| 13.2 | 33.528 | 1124.127 | 0.089 |
| 10.1 | 25.654 | 658.128 | 0.052 |
| 10.4 | 26.416 | 697.805 | 0.055 |
| 4.4 | 11.176 | 124.903 | 0.010 |
| 7.3 | 18.542 | 343.806 | 0.027 |
| 5.2 | 13.208 | 174.451 | 0.014 |
| 21.3 | 54.102 | 2927.026 | 0.231 |
| 4.4 | 11.176 | 124.903 | 0.010 |
| 13.3 | 33.782 | 1141.224 | 0.090 |
| 9.9 | 25.146 | 632.321 | 0.050 |
| 4.1 | 10.414 | 108.451 | 0.009 |
| 4.5 | 11.430 | 130.645 | 0.010 |
| 14.5 | 36.830 | 1356.449 | 0.107 |
| 11.0 | 27.940 | 780.644 | 0.062 |
| 9.7 | 24.638 | 607.031 | 0.048 |
| 7.0 | 17.780 | 316.128 | 0.025 |
| 4.6 | 11.684 | 136.516 | 0.011 |
| | | **Total** | **1.625** |

PFO

# Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A-Team

**Project Name/Location:** 7 HILLS | PLOT 4 **Date :** 4-6-2017

**Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.**

1. $V_{TRACT}$ Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 810 ha

2. $V_{CORE}$ Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %

3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %

4. $V_{SLOPE}$ Percent floodplain slope ..... 0.03 %

5. $V_{STORE}$ Floodplain width to channel width ratio ..... 5635 / 50 ..... 112

6. $V_{MACRO}$ Percent of WAA covered with macrotopographic features ..... 6 %

**Sample variables 7-17 based on a walking reconnaissance of the WAA**

7. $V_{FREQ}$ Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____ .

8. $V_{ROUGH}$ Roughness Coefficient .03 ($n_{BASE}$) + .005 ($n_{TOPO}$) + .01 ($n_{OBS}$) + .1 ($n_{VEG}$) = ..... 0.145

9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.

10. $V_{WTF}$ Water table fluctuation is (check one): ..... present ✓ absent ____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.

11. $V_{WTD}$ Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey ✓.

12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %

13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)

14. $V_{PORE}$ Percent effective soil porosity ..... 43 %

15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 67 %

16. $V_{CLAY}$ Percent of WAA with altered clay content in soil profile ..... SILTY CLAY ..... 0 %

17. $V_{REDOX}$ Redoximorphic features are (check one): ..... present ✓ absent ____

PLOT 4

**Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)**

1-0.04 ha plot sampled

18. $V_{TBA}$ Tree basal area (average of 0.04 ha plot values on next line) . . . . . 52.08 $m^2$/ha
0.04 ha plots: 1 ____ $m^2$/ha 2 ____ $m^2$/ha 3 ____ $m^2$/ha 4 ____ $m^2$/ha

19. $V_{TDEN}$ Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 1125 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. $V_{SNAG}$ Number of snags (average of 0.04 ha plot values on next line) . . . . . 50 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot**

2-15m transects sampled

21. $V_{WD}$ Volume of woody debris (average of transect values on next line) . . . . . 11.4 $m^3$/ha
Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

22. $V_{LOG}$ Volume of logs (average of transect values on next line) . . . . . 0 $m^3$/ha
Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

**Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot**

2-0.004 subplots sampled

23. $V_{SSD}$ Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 1250 stems / ha
0.04 ha plots: 1 1250 stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 24-26 in four (4) $m^2$ subplots placed in representative locations of each quadrant of the 0.04 ha plot**

24. $V_{GVC}$ Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 30 %
Average of 0.04 ha plots sampled: 1 25 % 2 25 % 3 30 % 4 40 %

25. $V_{OHOR}$ Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 81 %
Average of 0.04 ha plots sampled: 1 95 % 2 100 % 3 50 % 4 80 %

26. $V_{AHOR}$ Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
Average of 0.04 ha plots sampled: 1 100 % 2 100 % 3 100 % 4 100 %

27. $V_{COMP}$ Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 83 %
Average of 0.04 ha plots sampled: 1 83 % 2 ____ % 3 ____ % 4 ____ %

1-0.04 ha plot sampled for trees & shrub/saplings
* 1 $m^2$ plots sampled for ground vegetation.

PFO

# Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A-Team

**Project Name/Location :** 7HILLS **Plot Number :** 4 **Date :** 4-6-2017

Record dbh (cm) of trees by species below, square dbh values ($cm^2$), multiply result by 0.000079 ($m^2$), and sum resulting values in shaded columns ($m^2$/0.04 ha). Record in 18. $V_{TBA}$, multiply by 25 ($m^2$/ha).

| Species | dbh (cm) | dbh² (cm²) | × 0.00079 (m²/0.04 ha) | Species | dbh (cm) | dbh² (cm²) | × 0.00079 (m²/0.04 ha) |
|---|---|---|---|---|---|---|---|
| SILVERMAPLE | 6.2 | | | R. BIRCH | 7.9 | | |
| SILVER M. | 12 | | | SILVER M. | 4.7 | | |
| R. BIRCH | 8.9 | | | SYCAMORE | 6.8 | | |
| R. BIRCH | 12 | | | SILVER M | 5.0 | | |
| SILVER M. | 6.4 | | | R. BIRCH | 10.9 | | |
| R. BIRCH | 8.9 | | | R. BIRCH | 7.5 | | |
| R. BIRCH | 8.5 | | | R. BIRCH | 9.5 | | |
| R. BIRCH | 10.3 | | | PIN OAK | 6.2 | | |
| SILVER M | 7.9 | | | R. BIRCH | 8.0 | | |
| BOX ELD | 4.1 | | | R. BIRCH | 10.5 | | |
| BOX ELD. | 4.2 | | | R. BIRCH | 9.9 | | |
| R. BIRCH | 9.7 | | | AM ELM | 3.9 | | |

**18.** $V_{TBA}$ Sum of values from shaded columns above = 2.134 ($m^2$/0.04 ha) × 25 = 53.36 $m^2$/ha

**19.** $V_{TDEN}$ Total number of tree stems from above = 45 (stems/0.04 ha) × 25 = 1125 stems/ha

**20.** $V_{SNAG}$ Total number of snag stems from above= 2 (stems/0.04 ha) × 25 = 50 stems/ha

**21/22.** $V_{WD}$ /$V_{LOG}$

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 " " Transect 2 " " *Total number of stems* = 6

**Size Class 1** tons /acre = 0.187 × *total number of stems* = ..... 1.1 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 _____ Transect 2 " " *Total number of stems* = 2

**Size Class 2** tons / acre = 0.892 × *total number of stems* = ..... 1.8 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

| Transect 1 | diameter | diameter² | Transect 2 | diameter | diameter² |
|---|---|---|---|---|---|
| Stem 1 = | 0 | - | Stem 1 = | 0 | - |
| Stem 2 = | | | Stem 2 = | | |
| Stem 3 = | | | Stem 3 = | | |
| Stem 4 = | | | Stem 4 = | | |
| Total diameter² | | 0 | Total diameter ² | | 0 |

*Total diameter² of stems from both transects* = 0

PIN OAK - 4.1

R BIRCH - 11.7 | 11.6 | 11 | 8.5 | 9.9 | 6.7 | 11.4

AM ELM - 9.2

R BIRCH 11.5 | 12.0 | 10 | 7.8

SILVER M. - 5.8 | 6.8 | 7.2 | 7.5

SYCAMORE | 4.3 | 5.3

GR. ASH - 4.4

COTTONWOOD 28.8

PLOT 4

**Size Class 3** tons / acre = 0.0687 × *Total diameter² of stems from both transects* = . 0 tons/acre
*Total tons / acre* (sum of Size Classes 1-3 from above) = ..... 2.19 tons/acre
*Cubic feet / acre* = (32.05 × *total tons / acre*) / 0.58 = ..... 160.3 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 ..... 11.1 cubic meters/ha $V_{WA}$

**23.** $V_{SSD}$ Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
Subplot 1 HH III Subplot 2 II Average 5 × 250 = .1250 stems/ha

**24.** $V_{GVC}$ Estimate percent cover of ground vegetation in four m² subplots then average:
1 25 % 2 25 % 3 30 % 4 40 % ..... Average 30 %

**25.** $V_{OHOR}$ Estimate percent cover of "O" Horizon in four m² subplots then average:
1 95 % 2 100 % 3 50 % 4 80 % ..... Average 81 %

**26.** $V_{AHOR}$ Estimate percent cover of "A" Horizon in four m² subplots then average:
1 100% 2 100% 3 100% 4 100% ..... Average 100 %

**27.** $V_{COMP}$ Determine percent concurrence with each strata using the table below
Tree = 100 % Shrub/Sapling = 100 % Ground Vegetation = 50 % .... Average 83 %

| Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands | | |
|---|---|---|
| Tree | Shrub/Sapling | Ground Vegetation |
| *Acer rubrum* ✓ | *Acer rubrum* | *Arundinaria gigantea* |
| *Betula nigra* ✓ | *Betula nigra* | *Aster* sp. 15% |
| *Carya laciniosa* | *Carya laciniosa* | *Boehmaria cylindrica* |
| *Celtis laevigata* | *Carpinus caroliniana* | *Campsis radicans* ✓ |
| *Fraxinus pennsylvanica* | *Celtis laevigata* | *Carex squarosa* |
| *Liquidambar styraciflua* | *Celtis occidentalis* | *Eragrostis alba* |
| *Quercus pagodifolia* | *Fraxinus pennsylvanica* FP ✓ | *Glyceria striata* |
| *Quercus phellos* | *Ilex decidua* | *Hypericum* sp. |
| *Quercus lyrata* | *Liquidambar styraciflua* | *Impatiens capensis* |
| *Quercus imbricaria* | *Nyssa sylvatica* | *Panicum* sp. |
| *Quercus michauxii* | *Quercus imbricaria* | *Parthenocissus quinquefolia* |
| *Quercus stellata* | *Quercus lyrata* | *Pilea pumila* |
| *Quercus palustris* | *Quercus phellos* | *Quercus phellos* |
| *Salix nigra* | *Quercus palustris* | *Salix nigra* |
| | *Quercus pagodifolia* | *Saurauris cernuus* |
| | *Quercus stellata* | *Smilacina racemosa* |
| | *Platanus occidentalis* | *Smilax rotundifolia* |
| | *Salix nigra* | *Sparganium* sp. |
| | *Ulmus americana* ✓ | *Toxicodendron radicans* ✓ |

2.13
50% - 1.06
20% - 443

RIVERBIRCH 1.2 56 — GRASH 6 — 60%
COTTONWD 0.42 — RM ELM 2 — 20%

CREEPING JENNY 5% ✓
ASTER SP. 15% ✓
RANUNCLUS SP. 4%
CAREX SP. 1%
25%

***Basal Area - PLOT 4***

| dbh (in) | dbh (cm) | cm² | x .000079 |
|---|---|---|---|
| 6.2 | 15.748 | 248.000 | 0.020 |
| 12.0 | 30.480 | 929.030 | 0.073 |
| 8.9 | 22.606 | 511.031 | 0.040 |
| 12.0 | 30.480 | 929.030 | 0.073 |
| 6.4 | 16.256 | 264.258 | 0.021 |
| 8.9 | 22.606 | 511.031 | 0.040 |
| 8.5 | 21.590 | 466.128 | 0.037 |
| 10.3 | 26.162 | 684.450 | 0.054 |
| 7.9 | 20.066 | 402.644 | 0.032 |
| 4.1 | 10.414 | 108.451 | 0.009 |
| 4.2 | 10.668 | 113.806 | 0.009 |
| 9.7 | 24.638 | 607.031 | 0.048 |
| 7.9 | 20.066 | 402.644 | 0.032 |
| 4.7 | 11.938 | 142.516 | 0.011 |
| 6.8 | 17.272 | 298.322 | 0.024 |
| 5.0 | 12.700 | 161.290 | 0.013 |
| 10.9 | 27.686 | 766.515 | 0.061 |
| 7.5 | 19.050 | 362.903 | 0.029 |
| 9.5 | 24.130 | 582.257 | 0.046 |
| 6.2 | 15.748 | 248.000 | 0.020 |
| 8.0 | 20.320 | 412.902 | 0.033 |
| 10.5 | 26.670 | 711.289 | 0.056 |
| 9.9 | 25.146 | 632.321 | 0.050 |
| 3.9 | 9.906 | 98.129 | 0.008 |
| 4.1 | 10.414 | 108.451 | 0.009 |
| 5.8 | 14.732 | 217.032 | 0.017 |
| 6.8 | 17.272 | 298.322 | 0.024 |
| 7.2 | 18.288 | 334.451 | 0.026 |
| 7.5 | 19.050 | 362.903 | 0.029 |
| 14.3 | 36.322 | 1319.288 | 0.104 |
| 5.3 | 13.462 | 181.225 | 0.014 |
| 11.7 | 29.718 | 883.160 | 0.070 |
| 11.6 | 29.464 | 868.127 | 0.069 |
| 11.0 | 27.940 | 780.644 | 0.062 |
| 8.5 | 21.590 | 466.128 | 0.037 |
| 9.9 | 25.146 | 632.321 | 0.050 |
| 6.7 | 17.018 | 289.612 | 0.023 |
| 11.4 | 28.956 | 838.450 | 0.066 |
| 9.2 | 23.368 | 546.063 | 0.043 |
| 4.4 | 11.176 | 124.903 | 0.010 |
| 28.8 | 73.152 | 5351.215 | 0.423 |
| 11.5 | 29.210 | 853.224 | 0.067 |
| 12.0 | 30.480 | 929.030 | 0.073 |
| 10.0 | 25.400 | 645.160 | 0.051 |
| 7.8 | 19.812 | 392.515 | 0.031 |
| | | **Total** | **2.134** |

plot 5

DSS

# Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A-Team

**Project Name/Location:** 7 Hills Plot 5B **Date :** 4-6-2017

**Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.**

1. $V_{TRACT}$ Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha
2. $V_{CORE}$ Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %
3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %
4. $V_{SLOPE}$ Percent floodplain slope ..... 0.03 %
5. $V_{STORE}$ Floodplain width to channel width ratio 4742/50 ..... 95
6. $V_{MACRO}$ Percent of WAA covered with macrotopographic features ..... 6 %

**Sample variables 7-17 based on a walking reconnaissance of the WAA**

7. $V_{FREQ}$ Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____ .
8. $V_{ROUGH}$ Roughness Coefficient .03 $(n_{BASE})$ + .01 $(n_{TOPO})$ + .025 $(n_{OBS})$ + .1 $(n_{VEG})$ = ..... 0.165
9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.
10. $V_{WTF}$ Water table fluctuation is (check one): ..... present ✓ absent ____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
11. $V_{WTD}$ Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey ✓.
12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %
13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)
14. $V_{PORE}$ Percent effective soil porosity ..... 43 %
15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 67 %
16. $V_{CLAY}$ Percent of WAA with altered clay content in soil profile SILT LOAM ..... 0 %
17. $V_{REDOX}$ Redoximorphic features are (check one): ..... present ✓ absent ____

PLOT 5B

**Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)**

1-0.04 ha plot sampled

18. $V_{TBA}$ Tree basal area (average of 0.04 ha plot values on next line) . . . . . 12.77 $m^2$/ha
0.04 ha plots: 1 ____ $m^2$/ha 2 ____ $m^2$/ha 3 ____ $m^2$/ha 4 ____ $m^2$/ha

19. $V_{TDEN}$ Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 925 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. $V_{SNAG}$ Number of snags (average of 0.04 ha plot values on next line) . . . . . 0 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot**

2-15m transects sampled

21. $V_{WD}$ Volume of woody debris (average of transect values on next line) . . . . . 23.6 $m^3$/ha
Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

22. $V_{LOG}$ Volume of logs (average of transect values on next line) . . . . . 17,354 $m^3$/ha
Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

**Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot**

2-0.004 ha subplots sampled

23. $V_{SSD}$ Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 3500 stems / ha
0.04 ha plots: 1 3500 stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 24-26 in four (4) $m^2$ subplots placed in representative locations of each quadrant of the 0.04 ha plot**

24. $V_{GVC}$ Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 75 %
Average of 0.04 ha plots sampled: 1 10 % 2 5 % 3 15 % 4 0 %

25. $V_{OHOR}$ Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
Average of 0.04 ha plots sampled: 1 100 % 2 100 % 3 100 % 4 100 %

26. $V_{AHOR}$ Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
Average of 0.04 ha plots sampled: 1 100 % 2 100 % 3 100 % 4 100 %

27. $V_{COMP}$ Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 67 %
Average of 0.04 ha plots sampled: 1 67 % 2 ____ % 3 ____ % 4 ____ %

1-0.04 ha plot sampled for trees & shrub/saplings

* 1 $m^2$ plots sampled for ground vegetation

# Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A TEAM

**Project Name/Location :** THIUS **Plot Number :** SB **Date :** 4-6-2017

Record dbh (cm) of trees by species below, square dbh values ($cm^2$), multiply result by 0.000079 ($m^2$), and sum resulting values in shaded columns ($m^2$/0.04 ha). Record in 18. $V_{TBA}$, multiply by 25 ($m^2$/ha).

| Species | dbh (cm) | $dbh^2$ ($cm^2$) | × 0.00079 ($m^2$/0.04 ha) | Species | dbh (cm) | $dbh^2$ ($cm^2$) | × 0.00079 ($m^2$/0.04 ha) |
|---|---|---|---|---|---|---|---|
| BL. WILLOW | 6.0 | | | " " | 5.3 | | |
| BL. WILLOW | 4.9 | | | " " | 4.6 | | |
| BL. WILLOW | 4.4 | | | " " | 5.0 | | |
| " " | 4.1 | | | " " | 4.9 | | |
| " " | 4.5 | | | " " | 4.8 | | |
| " " | 5.3 | | | " " | 5.7 | | |
| " " | 4.2 | | | " " | 3.9 | | |
| " " | 7.4 | | | " " | 4.5 | | |
| " " | 8.6 | | | " " | 5.0 | | |
| " " | 5.4 | | | " " | 5.7 | | |
| " " | 6.0 | | | " " | 6.2 | | |
| " " | 5.9 | | | " " | 4.3 | | |

BL WI. 5.5
" " 4.0
" " 4.0
" " 5.4
" " 4.3
" " 4.9
" " 4.8
" " 5.1
" " 4.3
" " 5.4
" " 4.6
" " 4.5
" " 6.0

**18.** $V_{TBA}$ Sum of values from shaded columns above = 151.1 ($m^2$/0.04 ha) × 25 = 12.77 $m^2$/ha

**19.** $V_{TDEN}$ Total number of tree stems from above = 37 (stems/0.04 ha) × 25 = 925 stems/ha

**20.** $V_{SNAG}$ Total number of snag stems from above= 0 (stems/0.04 ha) × 25 = 0 stems/ha

**21/22.** $V_{WD}$ /$V_{LOG}$

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 ° ° Transect 2 ° ° *Total number of stems* = 4

**Size Class 1** tons /acre = 0.187 × *total number of stems* = ..... 0.7 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 ° Transect 2 _____ *Total number of stems* = 1

**Size Class 2** tons / acre = 0.892 × *total number of stems* = ..... 0.9 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

| Transect 1 | diameter | diameter$^2$ | Transect 2 | diameter | diameter$^2$ |
|---|---|---|---|---|---|
| Stem 1 = | 7.3 | 53.29 | Stem 1 = | 3.6 | 12.96 |
| Stem 2 = | | | Stem 2 = | | |
| Stem 3 = | | | Stem 3 = | | |
| Stem 4 = | | | Stem 4 = | | |
| Total diameter$^2$ | | 53.29 | Total diameter$^2$ | | 13.00 |

*Total diameter$^2$ of stems from both transects* = 66.3

PLOT 5B

**Size Class 3** tons / acre = 0.0687 × *Total diameter*$^2$ *of stems from both transects* = . 4.6 tons/acre
*Total tons / acre* (sum of Size Classes 1-3 from above) = . . . . . 6.2 tons/acre
*Cubic feet / acre* = (32.05 × *total tons / acre*) / 0.58 = . . . . . 342.6 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 . . . . . 23.6 cubic meters/ha $V_{WS}$

**23.** $V_{SSD}$ Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
Subplot 1 IIII Subplot 2 IIII IIII IIII IIII III Average 14 × 250 = . 3500 stems/ha

**24.** $V_{GVC}$ Estimate percent cover of ground vegetation in four m$^2$ subplots then average:
1 10 % 2 5 % 3 15 % 4 0 % . . . . . Average 7.5 %

**25.** $V_{OHOR}$ Estimate percent cover of "O" Horizon in four m$^2$ subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % . . . . . Average 100 %

**26.** $V_{AHOR}$ Estimate percent cover of "A" Horizon in four m$^2$ subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % . . . . . Average 100 %

**27.** $V_{COMP}$ Determine percent concurrence with each strata using the table below
Tree = 100 % Shrub/Sapling = 100 % Ground Vegetation = 0 % . . . . Average 67 %

| Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands | | |
|---|---|---|
| Tree | Shrub/Sapling | Ground Vegetation |
| *Acer rubrum* | *Acer rubrum* | *Arundinaria gigantea* |
| *Betula nigra* | *Betula nigra* | *Aster* sp. |
| *Carya laciniosa* | *Carya laciniosa* | *Boehmaria cylindrica* |
| *Celtis laevigata* | *Carpinus caroliniana* | *Campsis radicans* |
| *Fraxinus pennsylvanica* | *Celtis laevigata* | *Carex squarosa* |
| *Liquidambar styraciflua* | *Celtis occidentalis* | *Eragrostis alba* |
| *Quercus pagodifolia* | *Fraxinus pennsylvanica* ☒ : ✓ | *Glyceria striata* |
| *Quercus phellos* | *Ilex decidua* | *Hypericum* sp. |
| *Quercus lyrata* | *Liquidambar styraciflua* | *Impatiens capensis* |
| *Quercus imbricaria* | *Nyssa sylvatica* | *Panicum* sp. |
| *Quercus michauxii* | *Quercus imbricaria* | *Parthenocissus quinquefolia* |
| *Quercus stellata* | *Quercus lyrata* | *Pilea pumila* |
| *Quercus palustris* | *Quercus phellos* | *Quercus phellos* |
| *Salix nigra* ✓ | *Quercus palustris* | *Salix nigra* |
| | *Quercus pagodifolia* | *Sauraurus cernuus* |
| | *Quercus stellata* | *Smilacina racemosa* |
| | *Platanus occidentalis* ✓ | *Smilax rotundifolia* |
| | *Salix nigra* ☒ : ✓ | *Sparganium* sp. |
| | *Ulmus americana* | *Toxicodendron radicans* |

GR ASH 13 | 46% — LIZARD'S TAIL 10%
BL WILLOW 15 | 53

***Basal Area - PLOT 5B***

| dbh (in) | dbh (cm) | cm² | x .000079 |
|---|---|---|---|
| 6.0 | 15.240 | 232.258 | 0.018 |
| 4.9 | 12.446 | 154.903 | 0.012 |
| 4.4 | 11.176 | 124.903 | 0.010 |
| 4.1 | 10.414 | 108.451 | 0.009 |
| 4.5 | 11.430 | 130.645 | 0.010 |
| 5.3 | 13.462 | 181.225 | 0.014 |
| 4.2 | 10.668 | 113.806 | 0.009 |
| 7.4 | 18.796 | 353.290 | 0.028 |
| 8.6 | 21.844 | 477.160 | 0.038 |
| 5.4 | 13.716 | 188.129 | 0.015 |
| 6.0 | 15.240 | 232.258 | 0.018 |
| 5.9 | 14.986 | 224.580 | 0.018 |
| 5.3 | 13.462 | 181.225 | 0.014 |
| 4.6 | 11.684 | 136.516 | 0.011 |
| 5.0 | 12.700 | 161.290 | 0.013 |
| 4.9 | 12.446 | 154.903 | 0.012 |
| 4.8 | 12.192 | 148.645 | 0.012 |
| 5.7 | 14.478 | 209.612 | 0.017 |
| 3.9 | 9.906 | 98.129 | 0.008 |
| 4.5 | 11.430 | 130.645 | 0.010 |
| 5.0 | 12.700 | 161.290 | 0.013 |
| 5.7 | 14.478 | 209.612 | 0.017 |
| 6.2 | 15.748 | 248.000 | 0.020 |
| 4.3 | 10.922 | 119.290 | 0.009 |
| 5.5 | 13.970 | 195.161 | 0.015 |
| 4.0 | 10.160 | 103.226 | 0.008 |
| 4.0 | 10.160 | 103.226 | 0.008 |
| 5.4 | 13.716 | 188.129 | 0.015 |
| 4.3 | 10.922 | 119.290 | 0.009 |
| 4.9 | 12.446 | 154.903 | 0.012 |
| 4.8 | 12.192 | 148.645 | 0.012 |
| 5.1 | 12.954 | 167.806 | 0.013 |
| 4.3 | 10.922 | 119.290 | 0.009 |
| 5.4 | 13.716 | 188.129 | 0.015 |
| 4.6 | 11.684 | 136.516 | 0.011 |
| 4.5 | 11.430 | 130.645 | 0.010 |
| 6.0 | 15.240 | 232.258 | 0.018 |
| | **Total** | | **0.511** |

# Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A-TEAM
**Project Name/Location:** 7 HILLS SITE 6 **Date :** 4-6-2017

**Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.**

1. $V_{TRACT}$ Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha
2. $V_{CORE}$ Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %
3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %
4. $V_{SLOPE}$ Percent floodplain slope ..... 0.03 %
5. $V_{STORE}$ Floodplain width to channel width ratio .... 3375/50 ..... 60
6. $V_{MACRO}$ Percent of WAA covered with macrotopographic features ..... 6 %

**Sample variables 7-17 based on a walking reconnaissance of the WAA**

7. $V_{FREQ}$ Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____ .
8. $V_{ROUGH}$ Roughness Coefficient .03 $(n_{BASE})$ + .01 $(n_{TOPO})$ + .025 $(n_{OBS})$ + .1 $(n_{VEG})$ = ..... 0.165
9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.
10. $V_{WTF}$ Water table fluctuation is (check one): ..... present ✓ absent _____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
11. $V_{WTD}$ Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %
13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)
14. $V_{PORE}$ Percent effective soil porosity ..... 43 %
15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 67 %
16. $V_{CLAY}$ Percent of WAA with altered clay content in soil profile ..... SILTY CLAY .. 0 %
17. $V_{REDOX}$ Redoximorphic features are (check one): ..... present ✓ absent _____

Plot 6

**Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)**

1-0.04 ha plot Sampled

18. $V_{TBA}$ Tree basal area (average of 0.04 ha plot values on next line) . . . . . 39.07 $m^2$/ha
0.04 ha plots: 1 ____ $m^2$/ha 2 ____ $m^2$/ha 3 ____ $m^2$/ha 4 ____ $m^2$/ha

19. $V_{TDEN}$ Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 675 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. $V_{SNAG}$ Number of snags (average of 0.04 ha plot values on next line) . . . . . 50 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot**

2-15m transects Sampled

21. $V_{WD}$ Volume of woody debris (average of transect values on next line) . . . . . 85.8 $m^3$/ha
Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

22. $V_{LOG}$ Volume of logs (average of transect values on next line) . . . . . 80.8 $m^3$/ha
Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

**Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot**

1-0.04 ha plot Sampled

23. $V_{SSD}$ Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 450 stems / ha
0.04 ha plots: 1 450 stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 24-26 in four (4) $m^2$ subplots placed in representative locations of each quadrant of the 0.04 ha plot**

24. $V_{GVC}$ Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 11.3 %
Average of 0.04 ha plots sampled: 1 20 % 2 10 % 3 5 % 4 10 %

25. $V_{OHOR}$ Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 83.8 %
Average of 0.04 ha plots sampled: 1 90 % 2 90 % 3 60 % 4 95 %

26. $V_{AHOR}$ Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
Average of 0.04 ha plots sampled: 1 100 % 2 100 % 3 100 % 4 100 %

27. $V_{COMP}$ Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 44.3 %
Average of 0.04 ha plots sampled: 1 44.3 % 2 ____ % 3 ____ % 4 ____ %

1-0.04 ha plot Sampled for trees & Shrub/Saplings
& 1 $m^2$ plots Sampled for ground vegetation

PFO

# Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A-TEAM

**Project Name/Location :** 7 HILLS **Plot Number :** 6 **Date :** 4-6-2017

Record dbh (cm) of trees by species below, square dbh values ($cm^2$), multiply result by 0.000079 ($m^2$), and sum resulting values in shaded columns ($m^2$/0.04 ha). Record in 18. $V_{TBA}$, multiply by 25 ($m^2$/ha).

| Species | dbh (cm) | dbh² (cm²) | × 0.00079 (m²/0.04 ha) | Species | dbh (cm) | dbh² (cm²) | × 0.00079 (m²/0.04 ha) |
|---|---|---|---|---|---|---|---|
| HACKBERRY 6.2 | | | | | | | |
| SILVER M. | 12.4 | | | SILVER M | 9.6 | | |
| SYCAMORE | 10.4 | | | " " | 12.2 | | |
| SILVER M | 8.7 | | | " " | 4.5 | | |
| SILVER M | 6.3 | | | " " | 5.3 | | |
| SUGARBERRY 6.0 | | | | | | | |
| SILVER M | 21.2 | | | BOX ELDER | 10.1 | | |
| SILVER M. | 9.0 | | | SUGARBERRY | 4.8 | | |
| SILVER M | 9.8 | | | SUGARBERRY | 6.6 | | |
| COTTONWOOD 22.5 | | | | | | | |
| SILVER M. | 10.3 | | | AM. ELM | 10.1 | | |
| SILVER M. | 12.1 | | | BOX ELDER | 7.9 | | |
| " " | 15.7 | | | AM. ELM | 4.0 | | |
| " " | 6.5 | | | BOX ELDER | 6.0 | | |
| " " | 15.2 | | | " " | 5.9 | | |

**18.** $V_{TBA}$ Sum of values from shaded columns above = 1.563 ($m^2$/0.04 ha) × 25 = 39.07 $m^2$/ha

**19.** $V_{TDEN}$ Total number of tree stems from above = 27 (stems/0.04 ha) × 25 = 675 stems/ha

**20.** $V_{SNAG}$ Total number of snag stems from above= 0 0 (stems/0.04 ha) × 25 = 50 stems/ha

**21/22.** $V_{WD}$ / $V_{LOG}$

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 0 Transect 2 0 0 *Total number of stems* = 2

**Size Class 1** tons /acre = 0.187 × *total number of stems* = . . . . . 0.4 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 0 Transect 2 1 *Total number of stems* = 1

**Size Class 2** tons / acre = 0.892 × *total number of stems* = . . . . . 0.9 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

| Transect 1 | diameter | diameter² | Transect 2 | diameter | diameter² |
|---|---|---|---|---|---|
| Stem 1 = | 15.5 | 240.3 | Stem 1 = | 4.7 | 22.1 |
| Stem 2 = | | | Stem 2 = | 3.2 | 10.2 |
| Stem 3 = | | | Stem 3 = | 6.0 | 36 |
| Stem 4 = | | | Stem 4 = | | |
| Total diameter² | | 240.3 | Total diameter ² | | 68.3 |

*Total diameter² of stems from both transects* = 308.6

Plot 6

**Size Class 3** tons / acre = 0.0687 × *Total diameter² of stems from both transects* = . 21.2 tons/acre
*Total tons / acre* (sum of Size Classes 1-3 from above) = . . . . . 22.5 tons/acre
*Cubic feet / acre* = (32.05 × *total tons / acre*) / 0.58 = . . . . . 1243.3 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 . . . . . 85.8 cubic meters/ha V=0

**23.** $V_{SSD}$ Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
104 SAMPLE Subplot 1 ~~1111 1111 1111~~ 111 ~~Subplot 2~~ _____ Average 18 × 250 = . 450 stems/ha

**24.** $V_{GVC}$ Estimate percent cover of ground vegetation in four m² subplots then average:
1 20 % 2 10 % 3 5 % 4 10 % . . . . . Average 11.3 %

**25.** $V_{OHOR}$ Estimate percent cover of "O" Horizon in four m² subplots then average:
1 90 % 2 90 % 3 60 % 4 95 % . . . . . Average 83.8 %

**26.** $V_{AHOR}$ Estimate percent cover of "A" Horizon in four m² subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % . . . . . Average 100 %

**27.** $V_{COMP}$ Determine percent concurrence with each strata using the table below
Tree = 0 % Shrub/Sapling = 100 % Ground Vegetation = 33 % . . . . Average 44.3 %

| Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands | | |
|---|---|---|
| Tree | Shrub/Sapling | Ground Vegetation |
| *Acer rubrum* | *Acer rubrum* | *Arundinaria gigantea* |
| *Betula nigra* | *Betula nigra* | *Aster* sp. ✓ |
| *Carya laciniosa* | *Carya laciniosa* | *Boehmaria cylindrica* |
| *Celtis laevigata* | *Carpinus caroliniana* | *Campsis radicans* ✓ |
| *Fraxinus pennsylvanica* | *Celtis laevigata* | *Carex squarosa* |
| *Liquidambar styraciflua* | *Celtis occidentalis* | *Eragrostis alba* |
| *Quercus pagodifolia* | *Fraxinus pennsylvanica* | *Glyceria striata* |
| *Quercus phellos* | *Ilex decidua* | *Hypericum* sp. |
| *Quercus lyrata* | *Liquidambar styraciflua* | *Impatiens capensis* |
| *Quercus imbricaria* | *Nyssa sylvatica* | *Panicum* sp. |
| *Quercus michauxii* | *Quercus imbricaria* | *Parthenocissus quinquefolia* |
| *Quercus stellata* | *Quercus lyrata* | *Pilea pumila* |
| *Quercus palustris* | *Quercus phellos* | *Quercus phellos* |
| *Salix nigra* | *Quercus palustris* | *Salix nigra* |
| | *Quercus pagodifolia* | *Saurauris cernuus* |
| | *Quercus stellata* | *Smilacina racemosa* |
| | *Platanus occidentalis* | *Smilax rotundifolia* |
| | *Salix nigra* | *Sparganium* sp. |
| | *Ulmus americana* | *Toxicodendron radicans* |

✓ COMMON BLUE VIOLET 5%
✓ ASTER SP. 10%
✓ CREEPING JENNY 5%

***Basal Area - PLOT 6***

| dbh (in) | dbh (cm) | cm² | x .000079 |
|---|---|---|---|
| 12.4 | 31.496 | 991.998 | 0.078 |
| 10.4 | 26.416 | 697.805 | 0.055 |
| 8.7 | 22.098 | 488.322 | 0.039 |
| 6.3 | 16.002 | 256.064 | 0.020 |
| 21.2 | 53.848 | 2899.607 | 0.229 |
| 9.0 | 22.860 | 522.580 | 0.041 |
| 9.8 | 24.892 | 619.612 | 0.049 |
| 10.3 | 26.162 | 684.450 | 0.054 |
| 12.1 | 30.734 | 944.579 | 0.075 |
| 15.7 | 39.878 | 1590.255 | 0.126 |
| 6.5 | 16.510 | 272.580 | 0.022 |
| 15.2 | 38.608 | 1490.578 | 0.118 |
| 9.6 | 24.384 | 594.579 | 0.047 |
| 12.2 | 30.988 | 960.256 | 0.076 |
| 4.5 | 11.430 | 130.645 | 0.010 |
| 5.3 | 13.462 | 181.225 | 0.014 |
| 10.1 | 25.654 | 658.128 | 0.052 |
| 4.8 | 12.192 | 148.645 | 0.012 |
| 6.6 | 16.764 | 281.032 | 0.022 |
| 10.1 | 25.654 | 658.128 | 0.052 |
| 7.9 | 20.066 | 402.644 | 0.032 |
| 4.0 | 10.160 | 103.226 | 0.008 |
| 6.0 | 15.240 | 232.258 | 0.018 |
| 5.9 | 14.986 | 224.580 | 0.018 |
| 6.2 | 15.748 | 248.000 | 0.020 |
| 6.0 | 15.240 | 232.258 | 0.018 |
| 22.5 | 57.150 | 3266.123 | 0.258 |
| | | **Total** | **1.563** |

PSS

# Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A-TEAM
**Project Name/Location:** 7 HILLS PLOT 7B **Date :** 4-6-2017

**Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.**

1. $V_{TRACT}$ Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha
2. $V_{CORE}$ Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %
3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %
4. $V_{SLOPE}$ Percent floodplain slope ..... 0.03 %
5. $V_{STORE}$ Floodplain width to channel width ratio ... 3375/50 ..... 67
6. $V_{MACRO}$ Percent of WAA covered with macrotopographic features ..... 6 %

**Sample variables 7-17 based on a walking reconnaissance of the WAA**

7. $V_{FREQ}$ Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____ .
8. $V_{ROUGH}$ Roughness Coefficient .09 $(n_{BASE})$ + .105 $(n_{TOPO})$ + .002 $(n_{OBS})$ + .105 $(n_{VEG})$ = ..... 0.132
9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.
10. $V_{WTF}$ Water table fluctuation is (check one): ..... present ✓ absent ____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
11. $V_{WTD}$ Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey ✓.
12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %
13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)
14. $V_{PORE}$ Percent effective soil porosity ..... 43 %
15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 67 %
16. $V_{CLAY}$ Percent of WAA with altered clay content in soil profile ... SILTY CLAY ..... 0 %
17. $V_{REDOX}$ Redoximorphic features are (check one): ..... present ✓ absent ____

PLOT 7B

**Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)**

1-0.04 ha plot sampled

18. $V_{TBA}$ Tree basal area (average of 0.04 ha plot values on next line) . . . . . 1.2 $m^2$/ha
0.04 ha plots: 1 ____ $m^2$/ha 2 ____ $m^2$/ha 3 ____ $m^2$/ha 4 ____ $m^2$/ha

19. $V_{TDEN}$ Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 25 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. $V_{SNAG}$ Number of snags (average of 0.04 ha plot values on next line) . . . . . 0 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot**

2-15 m transects Sampled

21. $V_{WD}$ Volume of woody debris (average of transect values on next line) . . . . . 0 $m^3$/ha
Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

22. $V_{LOG}$ Volume of logs (average of transect values on next line) . . . . . 0 $m^3$/ha
Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

**Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot**

1-0.04 ha plot sampled

23. $V_{SSD}$ Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 575 stems / ha
0.04 ha plots: 1 575 stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 24-26 in four (4) $m^2$ subplots placed in representative locations of each quadrant of the 0.04 ha plot**

24. $V_{GVC}$ Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 72 %
Average of 0.04 ha plots sampled: 1 90 % 2 80 % 3 40 % 4 80 %

25. $V_{OHOR}$ Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
Average of 0.04 ha plots sampled: 1 100 % 2 100 % 3 100 % 4 100 %

26. $V_{AHOR}$ Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
Average of 0.04 ha plots sampled: 1 100 % 2 100 % 3 100 % 4 100 %

27. $V_{COMP}$ Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 33 %
Average of 0.04 ha plots sampled: 1 33 % 2 ____ % 3 ____ % 4 ____ %

1-0.04 ha plot Sampled for trees & Shrub/Saplings

* 1m2 plots Sampled for ground vegetation.

# Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A-TEAM

**Project Name/Location :** 7 HILLS **Plot Number :** 7B **Date :** 4-6-2017

Record dbh (cm) of trees by species below, square dbh values ($cm^2$), multiply result by 0.000079 ($m^2$), and sum resulting values in shaded columns ($m^2$/0.04 ha). Record in 18. $V_{TBA}$, multiply by 25 ($m^2$/ha).

| Species | dbh (cm) | dbh$^2$ ($cm^2$) | × 0.00079 ($m^2$/0.04 ha) | Species | dbh (cm) | dbh$^2$ ($cm^2$) | × 0.00079 ($m^2$/0.04 ha) |
|---|---|---|---|---|---|---|---|
| GR. ASH | 9.8 | | | | | | |
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**18.** $V_{TBA}$ Sum of values from shaded columns above = 0.1049 ($m^2$/0.04 ha) × 25 = 1.2 $m^2$/ha

**19.** $V_{TDEN}$ Total number of tree stems from above = 1 (stems/0.04 ha) × 25 = 25 stems/ha

**20.** $V_{SNAG}$ Total number of snag stems from above= 0 (stems/0.04 ha) × 25 = 0 stems/ha

**21/22.** $V_{WD}$ /$V_{LOG}$

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 0 Transect 2 0 *Total number of stems* = _____

**Size Class 1** tons /acre = 0.187 × *total number of stems* = ..... 0 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 0 Transect 2 0 *Total number of stems* = _____

**Size Class 2** tons / acre = 0.892 × *total number of stems* = ..... 0 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

| Transect 1 | diameter | diameter$^2$ | Transect 2 | diameter | diameter$^2$ |
|---|---|---|---|---|---|
| Stem 1 = | 0 | 0 | Stem 1 = | 0 | 0 |
| Stem 2 = | | | Stem 2 = | | |
| Stem 3 = | | | Stem 3 = | | |
| Stem 4 = | | | Stem 4 = | | |
| Total diameter$^2$ | | 0 | Total diameter$^2$ | | 0 |

*Total diameter$^2$ of stems from both transects* = 0

PLOT 7B

**Size Class 3** tons / acre = 0.0687 × *Total diameter² of stems from both transects* = . 0 tons/acre
*Total tons / acre* (sum of Size Classes 1-3 from above) = ..... 0 tons/acre
*Cubic feet / acre* = (32.05 × *total tons / acre*) / 0.58 = ..... 0 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 ..... 0 cubic meters/ha

**23.** $V_{SSD}$ Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
104 SAMPLE Subplot 1 ~~HHT HHT HHT~~ HHT HHT HHT HHT 111 Subplot 2 _____ Average 23 × 250 = . 575 stems/ha

**24.** $V_{GVC}$ Estimate percent cover of ground vegetation in four m² subplots then average:
1 90 % 2 80 % 3 40 % 4 80 % ..... Average 72 %

**25.** $V_{OHOR}$ Estimate percent cover of "O" Horizon in four m² subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % ..... Average 100 %

**26.** $V_{AHOR}$ Estimate percent cover of "A" Horizon in four m² subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % ..... Average 100 %

**27.** $V_{COMP}$ Determine percent concurrence with each strata using the table below
Tree = 100 % Shrub/Sapling = 0 % Ground Vegetation = 0 % .... Average 33 %

| Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands | | |
|---|---|---|
| Tree | Shrub/Sapling | Ground Vegetation |
| *Acer rubrum* | *Acer rubrum* | *Arundinaria gigantea* |
| *Betula nigra* | *Betula nigra* | *Aster* sp. |
| *Carya laciniosa* | *Carya laciniosa* | *Boehmaria cylindrica* |
| *Celtis laevigata* | *Carpinus caroliniana* | *Campsis radicans* |
| *Fraxinus pennsylvanica* ✓ | *Celtis laevigata* | *Carex squarosa* |
| *Liquidambar styraciflua* | *Celtis occidentalis* | *Eragrostis alba* |
| *Quercus pagodifolia* | *Fraxinus pennsylvanica* | *Glyceria striata* |
| *Quercus phellos* | *Ilex decidua* | *Hypericum* sp. |
| *Quercus lyrata* | *Liquidambar styraciflua* | *Impatiens capensis* |
| *Quercus imbricaria* | *Nyssa sylvatica* | *Panicum* sp. |
| *Quercus michauxii* | *Quercus imbricaria* | *Parthenocissus quinquefolia* |
| *Quercus stellata* | *Quercus lyrata* | *Pilea pumila* |
| *Quercus palustris* | *Quercus phellos* | *Quercus phellos* |
| *Salix nigra* | *Quercus palustris* | *Salix nigra* |
| | *Quercus pagodifolia* | *Sauraurus cernuus* |
| | *Quercus stellata* | *Smilacina racemosa* |
| | *Platanus occidentalis* | *Smilax rotundifolia* |
| | *Salix nigra* | *Sparganium* sp. |
| | *Ulmus americana* | *Toxicodendron radicans* |

PHALARIS 90%

***Basal Area - PLOT 7B***

| dbh (in) | dbh (cm) | cm² | x .000079 |
|---|---|---|---|
| 9.8 | 24.892 | 619.612 | 0.049 |
| | | **Total** | **0.049** |

P55

# Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A-Team

**Project Name/Location:** T Willis Plot 8 **Date :** 4-7-2017

**Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.**

1. $V_{TRACT}$ Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha

2. $V_{CORE}$ Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %

3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %

4. $V_{SLOPE}$ Percent floodplain slope ..... 0.03 %

5. $V_{STORE}$ Floodplain width to channel width ratio ..... 3155/50 ..... 63

6. $V_{MACRO}$ Percent of WAA covered with macrotopographic features ..... 6 %

**Sample variables 7-17 based on a walking reconnaissance of the WAA**

7. $V_{FREQ}$ Overbank flood recurrence interval ..... 1 years
   Check data source: gage data __, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____.

8. $V_{ROUGH}$ Roughness Coefficient .03 ($n_{BASE}$) + .005 ($n_{TOPO}$) + .001 ($n_{OBS}$) + .05 ($n_{VEG}$) = ..... .095

9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.

10. $V_{WTF}$ Water table fluctuation is (check one): ..... present ✓ absent ____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.

11. $V_{WTD}$ Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey ✓.

12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %

13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)

14. $V_{PORE}$ Percent effective soil porosity ..... 43 %

15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 67 %

16. $V_{CLAY}$ Percent of WAA with altered clay content in soil profile SILTY CLAY ..... 0 %

17. $V_{REDOX}$ Redoximorphic features are (check one): ..... present ✓ absent ____

Plot 8

**Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)**

1-0.04 ha plot Sampled

18. $V_{TBA}$ Tree basal area (average of 0.04 ha plot values on next line) . . . . . 0 $m^2$/ha
0.04 ha plots: 1 ____ $m^2$/ha 2 ____ $m^2$/ha 3 ____ $m^2$/ha 4 ____ $m^2$/ha

19. $V_{TDEN}$ Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 0 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. $V_{SNAG}$ Number of snags (average of 0.04 ha plot values on next line) . . . . . 0 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot**

2-15 m transects Sampled

21. $V_{WD}$ Volume of woody debris (average of transect values on next line) . . . . . 9.5 $m^3$/ha
Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

22. $V_{LOG}$ Volume of logs (average of transect values on next line) . . . . . 9.5 $m^3$/ha
Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

**Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot**

2-0.004 ha subplots sampled

23. $V_{SSD}$ Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 10,000 stems / ha
0.04 ha plots: 1 10,000 stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 24-26 in four (4) $m^2$ subplots placed in representative locations of each quadrant of the 0.04 ha plot**

24. $V_{GVC}$ Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 0 %
Average of 0.04 ha plots sampled: 1 0 % 2 0 % 3 0 % 4 0 %

25. $V_{OHOR}$ Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
Average of 0.04 ha plots sampled: 1 100 % 2 100 % 3 100 % 4 100 %

26. $V_{AHOR}$ Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
Average of 0.04 ha plots sampled: 1 100 % 2 100 % 3 100 % 4 100 %

27. $V_{COMP}$ Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 0 %
Average of 0.04 ha plots sampled: 1 0 % 2 ____ % 3 ____ % 4 ____ %

1-0.04 ha plot sampled for trees & shrub/saplings & 1 $m^2$ plots sampled for ground vegetation.

# Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A-Team

**Project Name/Location :** Hills **Plot Number :** 8 **Date :** 4.7.2017

Record dbh (cm) of trees by species below, square dbh values ($cm^2$), multiply result by 0.000079 ($m^2$), and sum resulting values in shaded columns ($m^2$/0.04 ha). Record in 18. $V_{TBA}$, multiply by 25 ($m^2$/ha).

| Species | dbh (cm) | dbh$^2$ ($cm^2$) | × 0.00079 ($m^2$/0.04 ha) | Species | dbh (cm) | dbh$^2$ ($cm^2$) | × 0.00079 ($m^2$/0.04 ha) |
|---|---|---|---|---|---|---|---|
| None | | | | | | | |
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**18.** $V_{TBA}$ Sum of values from shaded columns above = 0 ($m^2$/0.04 ha) × 25 = 0 $m^2$/ha

**19.** $V_{TDEN}$ Total number of tree stems from above = 0 (stems/0.04 ha) × 25 = 0 stems/ha

**20.** $V_{SNAG}$ Total number of snag stems from above= 0 (stems/0.04 ha) × 25 = _____ stems/ha

**21/22.** $V_{WD}$ /$V_{LOG}$

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 0 Transect 2 0 *Total number of stems* = _____

**Size Class 1** tons /acre = 0.187 × *total number of stems* = . . . . . 6 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 0 Transect 2 0 *Total number of stems* = _____

**Size Class 2** tons / acre = 0.892 × *total number of stems* = . . . . . 0 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

| Transect 1 | diameter | diameter$^2$ | Transect 2 | diameter | diameter$^2$ |
|---|---|---|---|---|---|
| Stem 1 = | 6 | 36 | Stem 1 = | | 0 |
| Stem 2 = | | | Stem 2 = | | |
| Stem 3 = | | | Stem 3 = | | |
| Stem 4 = | | | Stem 4 = | | |
| Total diameter$^2$ | | 36 | Total diameter$^2$ | | 0 |

*Total diameter$^2$ of stems from both transects* = 36

PLOT 8

**Size Class 3** tons / acre = 0.0687 × *Total diameter² of stems from both transects* = . 2.5 tons/acre
*Total tons / acre* (sum of Size Classes 1-3 from above) = ..... 2.5 tons/acre
*Cubic feet / acre* = (32.05 × *total tons / acre*) / 0.58 = ..... 138.1 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 ..... 9.5 cubic meters/ha $V_{WO}$

**23.** $V_{SSD}$ Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
Subplot 1 (51) Subplot 2 (43) Average 40 × 250 = 10,000 stems/ha

**24.** $V_{GVC}$ Estimate percent cover of ground vegetation in four m² subplots then average:
1 0 % 2 0 % 3 0 % 4 0 % ..... Average 0 %

**25.** $V_{OHOR}$ Estimate percent cover of "O" Horizon in four m² subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % ..... Average 100 %

**26.** $V_{AHOR}$ Estimate percent cover of "A" Horizon in four m² subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % ..... Average 100 %

**27.** $V_{COMP}$ Determine percent concurrence with each strata using the table below
Tree = 0 % Shrub/Sapling = 0 % Ground Vegetation = 0 % .... Average 0 %

| Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands | | |
|---|---|---|
| Tree | Shrub/Sapling | Ground Vegetation |
| *Acer rubrum* | *Acer rubrum* | *Arundinaria gigantea* |
| *Betula nigra* | *Betula nigra* | *Aster* sp. |
| *Carya laciniosa* | *Carya laciniosa* | *Boehmaria cylindrica* |
| *Celtis laevigata* | *Carpinus caroliniana* | *Campsis radicans* |
| *Fraxinus pennsylvanica* | *Celtis laevigata* | *Carex squarosa* |
| *Liquidambar styraciflua* | *Celtis occidentalis* | *Eragrostis alba* |
| *Quercus pagodifolia* | *Fraxinus pennsylvanica* | *Glyceria striata* |
| *Quercus phellos* | *Ilex decidua* | *Hypericum* sp. |
| *Quercus lyrata* | *Liquidambar styraciflua* | *Impatiens capensis* |
| *Quercus imbricaria* | *Nyssa sylvatica* | *Panicum* sp. |
| *Quercus michauxii* | *Quercus imbricaria* | *Parthenocissus quinquefolia* |
| *Quercus stellata* | *Quercus lyrata* | *Pilea pumila* |
| *Quercus palustris* | *Quercus phellos* | *Quercus phellos* |
| *Salix nigra* | *Quercus palustris* | *Salix nigra* |
| | *Quercus pagodifolia* | *Sauraurus cernuus* |
| | *Quercus stellata* | *Smilacina racemosa* |
| | *Platanus occidentalis* | *Smilax rotundifolia* |
| | *Salix nigra* | *Sparganium* sp. |
| | *Ulmus americana* | *Toxicodendron radicans* |

PFO
PLOT 9

# Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** _____
**Project Name/Location:** 7 HILLS PLOT 9 **Date :** 4-7-2017

**Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.**

1. $V_{TRACT}$ Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha
2. $V_{CORE}$ Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %
3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %
4. $V_{SLOPE}$ Percent floodplain slope ..... 0.03 %
5. $V_{STORE}$ Floodplain width to channel width ratio ..... 3155/50 ..... 63
6. $V_{MACRO}$ Percent of WAA covered with macrotopographic features ..... 6 %

**Sample variables 7-17 based on a walking reconnaissance of the WAA**

7. $V_{FREQ}$ Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____ .
8. $V_{ROUGH}$ Roughness Coefficient .03 ($n_{BASE}$) + .005 ($n_{TOPO}$) + .01 ($n_{OBS}$) + .1 ($n_{VEG}$) = ..... .145
9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.
10. $V_{WTF}$ Water table fluctuation is (check one): ..... present ✓ absent _____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
11. $V_{WTD}$ Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey ✓.
12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 30 %
13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)
14. $V_{PORE}$ Percent effective soil porosity ..... 43 %
15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 67 %
16. $V_{CLAY}$ Percent of WAA with altered clay content in soil profile ..... SILTY CLAY ..... 0 %
17. $V_{REDOX}$ Redoximorphic features are (check one): ..... present ✓ absent _____

PLOT 9

**Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)**

1-0.04 ha plot sampled

18. $V_{TBA}$ Tree basal area (average of 0.04 ha plot values on next line) . . . . . 32.1 $m^2$/ha
0.04 ha plots: 1 ____ $m^2$/ha 2 ____ $m^2$/ha 3 ____ $m^2$/ha 4 ____ $m^2$/ha

19. $V_{TDEN}$ Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 750 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. $V_{SNAG}$ Number of snags (average of 0.04 ha plot values on next line) . . . . . 25 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot**

2-15m transects sampled

21. $V_{WD}$ Volume of woody debris (average of transect values on next line) . . . . . 32.4 $m^3$/ha
Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

22. $V_{LOG}$ Volume of logs (average of transect values on next line) . . . . . 24.1 $m^3$/ha
Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

**Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot**

1-0.04 ha plot sampled

23. $V_{SSD}$ Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 375 stems / ha
0.04 ha plots: 1 375 stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 24-26 in four (4) $m^2$ subplots placed in representative locations of each quadrant of the 0.04 ha plot**

24. $V_{GVC}$ Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 46 %
Average of 0.04 ha plots sampled: 1 49 % 2 65 % 3 30 % 4 40 %

25. $V_{OHOR}$ Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 97.5 %
Average of 0.04 ha plots sampled: 1 95 % 2 100 % 3 100 % 4 95 %

26. $V_{AHOR}$ Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
Average of 0.04 ha plots sampled: 1 100 % 2 100 % 3 100 % 4 100 %

27. $V_{COMP}$ Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 100 %
Average of 0.04 ha plots sampled: 1 100 % 2 ____ % 3 ____ % 4 ____ %

1-0.04 ha plot sampled for trees? Shrub/saplings

4 1m2 plots sampled for ground vegetation.

# Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** A-Team

**Project Name/Location :** 7HILLS **Plot Number :** 9 **Date :** 4-7-2017

Record dbh (cm) of trees by species below, square dbh values ($cm^2$), multiply result by 0.000079 ($m^2$), and sum resulting values in shaded columns ($m^2$/0.04 ha). Record in 18. $V_{TBA}$, multiply by 25 ($m^2$/ha).

| Species | dbh (cm) | $dbh^2$ ($cm^2$) | × 0.00079 ($m^2$/0.04 ha) | Species | dbh (cm) | $dbh^2$ ($cm^2$) | × 0.00079 ($m^2$/0.04 ha) |
|---|---|---|---|---|---|---|---|
| PIN OAK | 17.8 | | | Q. BICOLOR | 14.1 | | |
| GR ASH | 11.1 | | | PIN OAK | 5.4 | | |
| PIN OAK | 4.6 | | | Am. Elm | 11.0 | | |
| GR. ASH | 8.7 | | | Am. Elm | 4.2 | | |
| GR. ASH | 7.0 | | | GR ASH | 7.6 | | |
| Am. Elm | 5.4 | | | GR. ASH | 13.0 | | |
| GR. ASH | 12.6 | | | Am. Elm | 4.8 | | |
| PIN OAK | 4.1 | | | GR. ASH | 10.6 | | |
| GR. ASH | 13.1 | | | Am. Elm | 3.9 | | |
| GR. ASH | 8.5 | | | Q. BICOLOR | 14.8 | | |
| GR. ASH | 7.3 | | | GR ASH | 6.4 | | |
| Am. Elm | 4.1 | | | PIN OAK | 11.2 | | |

**18.** $V_{TBA}$ Sum of values from shaded columns above = 1.285 ($m^2$/0.04 ha) × 25 = 32.1 $m^2$/ha

**19.** $V_{TDEN}$ Total number of tree stems from above = 30 (stems/0.04 ha) × 25 = 750 stems/ha

**20.** $V_{SNAG}$ Total number of snag stems from above= 1 (stems/0.04 ha) × 25 = 25 stems/ha

**21/22.** $V_{WD}$ /$V_{LOG}$

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 :: Transect 2 : *Total number of stems* = 7

**Size Class 1** tons /acre = 0.187 × *total number of stems* = ..... 1.3 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 0 Transect 2 * *Total number of stems* = 1

**Size Class 2** tons / acre = 0.892 × *total number of stems* = ..... .9 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

| Transect 1 | diameter | diameter$^2$ | Transect 2 | diameter | diameter$^2$ |
|---|---|---|---|---|---|
| Stem 1 = | 9.6 | 92.2 | Stem 1 = | 0 | 0 |
| Stem 2 = | | | Stem 2 = | | |
| Stem 3 = | | | Stem 3 = | | |
| Stem 4 = | | | Stem 4 = | | |
| Total diameter$^2$ | | 92.2 | Total diameter$^2$ | | 0 |

*Total diameter$^2$ of stems from both transects* = 92.2

BOX ELDER - 6.0

AM. ELM - 4.7 | 5.8

PIN OAK - 6.2

GR. ASH - 6.2 | 10.7

PLOT 9

**Size Class 3** tons / acre = 0.0687 × *Total diameter*$^2$ *of stems from both transects* = . 6.3 tons/acre
*Total tons / acre* (sum of Size Classes 1-3 from above) = . . . . . 8.5 tons/acre
*Cubic feet / acre* = (32.05 × *total tons / acre*) / 0.58 = . . . . . 469.7 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 . . . . . 32.4 cubic meters/ha $V_{WA}$

**23.** $V_{SSD}$ Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
.04 SAMPLE ~~Subplot 1~~ ~~HHT HHT HHT~~ ~~Subplot 2~~ _____ Average 15 × 250 = . 375 stems/ha

**24.** $V_{GVC}$ Estimate percent cover of ground vegetation in four m$^2$ subplots then average:
1 49 % 2 65 % 3 30 % 4 40 % . . . . . Average 46 %

**25.** $V_{OHOR}$ Estimate percent cover of "O" Horizon in four m$^2$ subplots then average:
1 95 % 2 100 % 3 100 % 4 95 % . . . . . Average 97.5 %

**26.** $V_{AHOR}$ Estimate percent cover of "A" Horizon in four m$^2$ subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % . . . . . Average 100 %

**27.** $V_{COMP}$ Determine percent concurrence with each strata using the table below
Tree = 100 % Shrub/Sapling = 100 % Ground Vegetation = 100 % . . . . Average 100 %

| Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands | | |
|---|---|---|
| Tree | Shrub/Sapling | Ground Vegetation |
| *Acer rubrum* | *Acer rubrum* | *Arundinaria gigantea* |
| *Betula nigra* | *Betula nigra* | *Aster* sp. ✓ |
| *Carya laciniosa* | *Carya laciniosa* | *Boehmaria cylindrica* |
| *Celtis laevigata* | *Carpinus caroliniana* | *Campsis radicans* |
| *Fraxinus pennsylvanica* | *Celtis laevigata* | *Carex squarosa* |
| *Liquidambar styraciflua* | *Celtis occidentalis* | *Eragrostis alba* |
| *Quercus pagodifolia* | *Fraxinus pennsylvanica* | *Glyceria striata* |
| *Quercus phellos* | *Ilex decidua* | *Hypericum* sp. |
| *Quercus lyrata* | *Liquidambar styraciflua* | *Impatiens capensis* |
| *Quercus imbricaria* | *Nyssa sylvatica* | *Panicum* sp. |
| *Quercus michauxii* | *Quercus imbricaria* | *Parthenocissus quinquefolia* |
| *Quercus stellata* | *Quercus lyrata* | *Pilea pumila* |
| *Quercus palustris* | *Quercus phellos* | *Quercus phellos* |
| *Salix nigra* | *Quercus palustris* | *Salix nigra* |
| | *Quercus pagodifolia* | *Sauraurus cernuus* |
| | *Quercus stellata* | *Smilacina racemosa* |
| | *Platanus occidentalis* | *Smilax rotundifolia* |
| | *Salix nigra* | *Sparganium* sp. |
| | *Ulmus americana* | *Toxicodendron radicans* ✓ |

*ASTER SP. - 35%
①CAREX SP. - 2%
VIOLA SORORIA - 7%
②CAREX SP. - 3%
CREEPING JENNY - 2%

49% total

***Basal Area - PLOT 9***

| dbh (in) | dbh (cm) | cm² | x .000079 |
|---|---|---|---|
| 17.8 | 45.212 | 2044.125 | 0.161 |
| 11.1 | 28.194 | 794.902 | 0.063 |
| 4.6 | 11.684 | 136.516 | 0.011 |
| 8.7 | 22.098 | 488.322 | 0.039 |
| 7.0 | 17.780 | 316.128 | 0.025 |
| 5.4 | 13.716 | 188.129 | 0.015 |
| 12.6 | 32.004 | 1024.256 | 0.081 |
| 4.1 | 10.414 | 108.451 | 0.009 |
| 13.1 | 33.274 | 1107.159 | 0.087 |
| 8.5 | 21.590 | 466.128 | 0.037 |
| 7.3 | 18.542 | 343.806 | 0.027 |
| 4.1 | 10.414 | 108.451 | 0.009 |
| 14.1 | 35.814 | 1282.643 | 0.101 |
| 5.4 | 13.716 | 188.129 | 0.015 |
| 11.0 | 27.940 | 780.644 | 0.062 |
| 4.2 | 10.668 | 113.806 | 0.009 |
| 7.6 | 19.304 | 372.644 | 0.029 |
| 13.0 | 33.020 | 1090.320 | 0.086 |
| 4.8 | 12.192 | 148.645 | 0.012 |
| 10.6 | 26.924 | 724.902 | 0.057 |
| 3.9 | 9.906 | 98.129 | 0.008 |
| 14.8 | 37.592 | 1413.158 | 0.112 |
| 6.4 | 16.256 | 264.258 | 0.021 |
| 11.2 | 28.448 | 809.289 | 0.064 |
| 6.2 | 15.748 | 248.000 | 0.020 |
| 10.7 | 27.178 | 738.644 | 0.058 |
| 6.0 | 15.240 | 232.258 | 0.018 |
| 4.7 | 11.938 | 142.516 | 0.011 |
| 5.8 | 14.732 | 217.032 | 0.017 |
| 6.5 | 16.510 | 272.580 | 0.022 |
| | | **Total** | **1.285** |

PFO

# Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** _____
**Project Name/Location:** 7 HILLS PLOT 10 **Date :** 4-14-17

**Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.**

1. $V_{TRACT}$ Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha
2. $V_{CORE}$ Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %
3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %
4. $V_{SLOPE}$ Percent floodplain slope ..... 0.03 %
5. $V_{STORE}$ Floodplain width to channel width ratio . 5706/50 ..... 114
6. $V_{MACRO}$ Percent of WAA covered with macrotopographic features ..... 6 %

**Sample variables 7-17 based on a walking reconnaissance of the WAA**

7. $V_{FREQ}$ Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____.
8. $V_{ROUGH}$ Roughness Coefficient .103 ($n_{BASE}$) + .066 ($n_{TOPO}$) + .101 ($n_{OBS}$) + .01 ($n_{VEG}$) = ..... 0.145
9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.
10. $V_{WTF}$ Water table fluctuation is (check one): ..... present ✓ absent ____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
11. $V_{WTD}$ Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %
13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)
14. $V_{PORE}$ Percent effective soil porosity ..... 43 %
15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 67 %
16. $V_{CLAY}$ Percent of WAA with altered clay content in soil profile ..... 0 %
17. $V_{REDOX}$ Redoximorphic features are (check one): ..... present ✓ absent ____

PLOT 10

**Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)**

18. $V_{TBA}$ Tree basal area (average of 0.04 ha plot values on next line) . . . . . 34.714 $m^2$/ha
    0.04 ha plots: 1 ____ $m^2$/ha 2 ____ $m^2$/ha 3 ____ $m^2$/ha 4 ____ $m^2$/ha

1-0.04 ha plot Sampled

19. $V_{TDEN}$ Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 275 stems / ha
    0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. $V_{SNAG}$ Number of snags (average of 0.04 ha plot values on next line) . . . . . 0 stems / ha
    0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot**

2-15m transects Sampled

21. $V_{WD}$ Volume of woody debris (average of transect values on next line) . . . . . 25.5 $m^3$/ha
    Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

22. $V_{LOG}$ Volume of logs (average of transect values on next line) . . . . . 6.06 $m^3$/ha
    Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

**Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot**

1-0.04 ha plot Sampled

23. $V_{SSD}$ Number of woody understory stems (average of 0.04 ha plot values on next line)
    . . . . . 875 stems / ha
    0.04 ha plots: 1 875 stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 24-26 in four (4) $m^2$ subplots placed in representative locations of each quadrant of the 0.04 ha plot**

24. $V_{GVC}$ Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 19 %
    Average of 0.04 ha plots sampled: 1 70 % 2 3 % 3 3 % 4 1 %

25. $V_{OHOR}$ Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 96 %
    Average of 0.04 ha plots sampled: 1 95 % 2 90 % 3 100 % 4 100 %

26. $V_{AHOR}$ Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
    Average of 0.04 ha plots sampled: 1 100 % 2 100 % 3 100 % 4 100 %

27. $V_{COMP}$ Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 78 %
    Average of 0.04 ha plots sampled: 1 78 % 2 ____ % 3 ____ % 4 ____ %

1-0.04 ha plot Sampled for trees? Shrub/Saplings

* 1 $m^2$ plots Sampled for ground vegetation.

# Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** _____

**Project Name/Location :** 7 HILLS **Plot Number :** 10 **Date :** 4-14-17

Record dbh (cm) of trees by species below, square dbh values ($cm^2$), multiply result by 0.000079 ($m^2$), and sum resulting values in shaded columns ($m^2$/0.04 ha). Record in 18. $V_{TBA}$, multiply by 25 ($m^2$/ha).

IH.

| Species | dbh (~~cm~~) | dbh² ($cm^2$) | × 0.00079 ($m^2$/0.04 ha) | Species | dbh (cm) | dbh² ($cm^2$) | × 0.00079 ($m^2$/0.04 ha) |
|---|---|---|---|---|---|---|---|
| SWAMPBELLY | 6.3 | | | | | | |
| RED MAPLE | 11.6 | | | | | | |
| SWEETGUM | 19 | | | | | | |
| RED MAPLE | 18.3 | | | | | | |
| RED MAPLE | 7.4 | | | | | | |
| BOX ELDER | 11.1 | | | | | | |
| SWEETGUM | 22.5 | | | | | | |
| HICKORY SHELLBARK | 6.2 | | | | | | |
| GREEN ASH | 18.2 | | | | | | |
| RED MAPLE | 19.6 | | | | | | |
| Q MICHAUX | 20.4 | | | | | | |
| | | | | | | | |

**18.** $V_{TBA}$ Sum of values from shaded columns above = 1.389 ($m^2$/0.04 ha) × 25 = 34.714 $m^2$/ha

**19.** $V_{TDEN}$ Total number of tree stems from above = 11 (stems/0.04 ha) × 25 = 275 stems/ha

**20.** $V_{SNAG}$ Total number of snag stems from above= 0 (stems/0.04 ha) × 25 = 0 stems/ha

**21/22.** $V_{WD}$ /$V_{LOG}$

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 III Transect 2 IIII *Total number of stems* = 8

**Size Class 1** tons /acre = 0.187 × *total number of stems* = ..... 1.5 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 IIII Transect 2 _____ *Total number of stems* = 4

**Size Class 2** tons / acre = 0.892 × *total number of stems* = ..... 3.6 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

| Transect 1 | diameter | diameter² | Transect 2 | diameter | diameter² |
|---|---|---|---|---|---|
| Stem 1 = | 3.3 | 10.89 | Stem 1 = | 0 | |
| Stem 2 = | 3.5 | 12.25 | Stem 2 = | | |
| Stem 3 = | | | Stem 3 = | | |
| Stem 4 = | | | Stem 4 = | | |
| Total diameter² | | 23.14 | Total diameter² | | 0 |

*Total diameter² of stems from both transects* = 23.14

PLOT 10

**Size Class 3** tons / acre = 0.0687 × *Total diameter² of stems from both transects* = . 1.59 tons/acre
*Total tons / acre* (sum of Size Classes 1-3 from above) = . . . . . 6.69 tons/acre
*Cubic feet / acre* = (32.05 × *total tons / acre*) / 0.58 = . . . . . 369.7 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 . . . . . 25.5 cubic meters/ha

V_WD

**23.** $V_{SSD}$ Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
Subplot 1 IIII IIII IIII IIII IIII IIII IIII IIII Subplot ~~2~~ _____ Average 35 × 250 = . 875 stems/ha

1.04 SAMPLE

**24.** $V_{GVC}$ Estimate percent cover of ground vegetation in four m² subplots then average:
1 70 % 2 3 % 3 3 % 4 1 % . . . . . Average 19 %

**25.** $V_{OHOR}$ Estimate percent cover of "O" Horizon in four m² subplots then average:
1 95 % 2 90 % 3 100 % 4 100 % . . . . . Average 96 %

**26.** $V_{AHOR}$ Estimate percent cover of "A" Horizon in four m² subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % . . . . . Average 100 %

**27.** $V_{COMP}$ Determine percent concurrence with each strata using the table below
Tree = 100 % Shrub/Sapling = 100 % Ground Vegetation = 33 % . . . . Average 78 %

| Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands | | |
|---|---|---|
| Tree | Shrub/Sapling | Ground Vegetation |
| *Acer rubrum* ✓ | *Acer rubrum* ✓ | *Arundinaria gigantea* |
| *Betula nigra* | *Betula nigra* | *Aster* sp. ✓ |
| *Carya laciniosa* | *Carya laciniosa* | *Boehmaria cylindrica* |
| *Celtis laevigata* | *Carpinus caroliniana* | *Campsis radicans* |
| *Fraxinus pennsylvanica* | *Celtis laevigata* | *Carex squarosa* |
| *Liquidambar styraciflua* ✓ | *Celtis occidentalis* | *Eragrostis alba* |
| *Quercus pagodifolia* | *Fraxinus pennsylvanica* ✓ | *Glyceria striata* |
| *Quercus phellos* | *Ilex decidua* | *Hypericum* sp. |
| *Quercus lyrata* | *Liquidambar styraciflua* | *Impatiens capensis* |
| *Quercus imbricaria* | *Nyssa sylvatica* | *Panicum* sp. |
| *Quercus michauxii* | *Quercus imbricaria* | *Parthenocissus quinquefolia* |
| *Quercus stellata* | *Quercus lyrata* | *Pilea pumila* |
| *Quercus palustris* | *Quercus phellos* | *Quercus phellos* |
| *Salix nigra* | *Quercus palustris* | *Salix nigra* |
| | *Quercus pagodifolia* | *Sauraurus cernuus* |
| | *Quercus stellata* | *Smilacina racemosa* |
| | *Platanus occidentalis* | *Smilax rotundifolia* |
| | *Salix nigra* | *Sparganium* sp. |
| | *Ulmus americana* | *Toxicodendron radicans* |

1.389
50% = 0.69
20% = 0.27

ACER R. 0.463 33%
LIQUIDAMBAR 0.442 31%
Q. MICHAUXII 0.212 15%

ACER R. (9) 25%
FRAXINUS P. (7) 20%
CARPINUS C. (4) 11%

ASTER SP. – 25 ✓
PACKERA OLAB. – 20 ✓
CREEPING JENNY – 15% ✓

***Basal Area - PLOT 10***

| dbh (in) | dbh (cm) | cm² | x .000079 |
|---|---|---|---|
| 6.3 | 16.002 | 256.064 | 0.020 |
| 11.6 | 29.464 | 868.127 | 0.069 |
| 19.0 | 48.260 | 2329.028 | 0.184 |
| 18.3 | 46.482 | 2160.576 | 0.171 |
| 7.4 | 18.796 | 353.290 | 0.028 |
| 11.1 | 28.194 | 794.902 | 0.063 |
| 22.5 | 57.150 | 3266.123 | 0.258 |
| 6.2 | 15.748 | 248.000 | 0.020 |
| 18.2 | 46.228 | 2137.028 | 0.169 |
| 19.6 | 49.784 | 2478.447 | 0.196 |
| 20.4 | 51.816 | 2684.898 | 0.212 |
| | | **Total** | **1.389** |

# Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** _____

**Project Name/Location:** 7 HILLS PLOT 11 **Date :** 4-14-17

**Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.**

1. $V_{TRACT}$ Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha

2. $V_{CORE}$ Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %

3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %

4. $V_{SLOPE}$ Percent floodplain slope ..... 0.03 %

5. $V_{STORE}$ Floodplain width to channel width ratio ...5706/50..... 114

6. $V_{MACRO}$ Percent of WAA covered with macrotopographic features ..... 6 %

**Sample variables 7-17 based on a walking reconnaissance of the WAA**

7. $V_{FREQ}$ Overbank flood recurrence interval ..... 1 years
   Check data source: gage data __, local knowledge __, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____.

8. $V_{ROUGH}$ Roughness Coefficient .03 $(n_{BASE})$ + .005 $(n_{TOPO})$ + .01 $(n_{OBS})$ + .1 $(n_{VEG})$ = ..... 0.145

9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.

10. $V_{WTF}$ Water table fluctuation is (check one): ..... present ✓ absent _____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.

11. $V_{WTD}$ Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.

12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %

13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)

14. $V_{PORE}$ Percent effective soil porosity ..... 43 %

15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 67 %

16. $V_{CLAY}$ Percent of WAA with altered clay content in soil profile ..... 0 %

17. $V_{REDOX}$ Redoximorphic features are (check one): ..... present ✓ absent _____

PLOT 11

**Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)**

1-0.04 ha plot sampled

18. $V_{TBA}$ Tree basal area (average of 0.04 ha plot values on next line) . . . . . 40.25 $m^2$/ha
0.04 ha plots: 1 ____ $m^2$/ha 2 ____ $m^2$/ha 3 ____ $m^2$/ha 4 ____ $m^2$/ha

19. $V_{TDEN}$ Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 425 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. $V_{SNAG}$ Number of snags (average of 0.04 ha plot values on next line) . . . . . 25 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot**

2-15 m transects sampled

21. $V_{WD}$ Volume of woody debris (average of transect values on next line) . . . . . 19.8 $m^3$/ha
Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

22. $V_{LOG}$ Volume of logs (average of transect values on next line) . . . . . 5.9 $m^3$/ha
Transect: 1 ____ $m^3$/ha 2 ____ $m^3$/ha 3 ____ $m^3$/ha 4 ____ $m^3$/ha

**Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot**

1-0.04 ha plot sampled

23. $V_{SSD}$ Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 950 stems / ha
0.04 ha plots: 1 950 stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

**Sample variables 24-26 in four (4) $m^2$ subplots placed in representative locations of each quadrant of the 0.04 ha plot**

24. $V_{GVC}$ Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 20 %
Average of 0.04 ha plots sampled: 1 15 % 2 5 % 3 25 % 4 35 %

25. $V_{OHOR}$ Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 98.8 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

26. $V_{AHOR}$ Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
Average of 0.04 ha plots sampled: 1 100 % 2 95 % 3 100 % 4 100 %

27. $V_{COMP}$ Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 33.3 %
Average of 0.04 ha plots sampled: 1 33 % 2 ____ % 3 ____ % 4 ____ %

1-0.04 ha plot Sampled for trees?
Shrub/Saplings

* 1 $m^2$ plots Sampled for ground vegetation.

PFO

# Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

**Assessment Team :** _____

**Project Name/Location :** 7 HILLS **Plot Number :** 11 **Date :** 4-14-17

Record dbh (cm) of trees by species below, square dbh values ($cm^2$), multiply result by 0.000079 ($m^2$), and sum resulting values in shaded columns ($m^2$/0.04 ha). Record in 18. $V_{TBA}$, multiply by 25 ($m^2$/ha).

IN.

| Species | dbh (~~cm~~) | $dbh^2$ ($cm^2$) | × 0.00079 ($m^2$/0.04 ha) | Species | dbh (cm) | $dbh^2$ ($cm^2$) | × 0.00079 ($m^2$/0.04 ha) |
|---|---|---|---|---|---|---|---|
| RED MAPLE | 6.8 | | | SWEETGUM | 13.6 | | |
| RED MAPLE | 4.9 | | | C. LACINIOSA | 4.0 | | |
| SNAG | | | | RED MAPLE | 5.7 | | |
| SWEETGUM | 27 | | | " " | 5.8 | | |
| RED MAPLE | 5.8 | | | " " | 10.4 | | |
| RED MAPLE | 14.5 | | | " " | 23.2 | | |
| " " | 14.6 | | | | | | |
| AM. ELM | 5.1 | | | | | | |
| RED MAPLE | 11.2 | | | | | | |
| RED MAPLE | 8.5 | | | | | | |
| " " | 18.8 | | | | | | |
| " " | 20.3 | | | | | | |

**18.** $V_{TBA}$ Sum of values from shaded columns above = 1.610 ($m^2$/0.04 ha) × 25 = 40.25 $m^2$/ha

**19.** $V_{TDEN}$ Total number of tree stems from above = 17 (stems/0.04 ha) × 25 = 425 stems/ha

**20.** $V_{SNAG}$ Total number of snag stems from above= 1 (stems/0.04 ha) × 25 = 25 stems/ha

**21/22.** $V_{WD}$ /$V_{LOG}$

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 IHT IHT Transect 2 0 *Total number of stems* = 10

**Size Class 1** tons /acre = 0.187 × *total number of stems* = ..... 1.9 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 11 Transect 2 0 *Total number of stems* = 2

**Size Class 2** tons / acre = 0.892 × *total number of stems* = ..... 1.8 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

| Transect 1 | diameter | diameter$^2$ | Transect 2 | diameter | diameter$^2$ |
|---|---|---|---|---|---|
| Stem 1 = | 3.5 | 12.25 | Stem 1 = | 3.2 | 10.24 |
| Stem 2 = | | | Stem 2 = | | |
| Stem 3 = | | | Stem 3 = | | |
| Stem 4 = | | | Stem 4 = | | |
| Total diameter$^2$ | | | Total diameter$^2$ | | |

*Total diameter$^2$ of stems from both transects* = 22.49

PLOT 11

**Size Class 3** tons / acre = 0.0687 × *Total diameter² of stems from both transects* = . 1.5 tons/acre
*Total tons / acre* (sum of Size Classes 1-3 from above) = . . . . . 5.2 tons/acre
*Cubic feet / acre* = (32.05 × *total tons / acre*) / 0.58 = . . . . . 287.3 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 . . . . . 19.8 cubic meters/ha $V_{WA}$

**23.** $V_{SSD}$ Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
Subplot 1 |||| |||| Subplot 2 _____ Average 38 × 250 = . 950 stems/ha
104 SAMPLE |||| |||| |||| |||| |||| |||

**24.** $V_{GVC}$ Estimate percent cover of ground vegetation in four m² subplots then average:
1 15 % 2 5 % 3 25 % 4 35 % . . . . . Average 20 %

**25.** $V_{OHOR}$ Estimate percent cover of "O" Horizon in four m² subplots then average:
1 100 % 2 95 % 3 100 % 4 100 % . . . . . Average 98.8 %

**26.** $V_{AHOR}$ Estimate percent cover of "A" Horizon in four m² subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % . . . . . Average 100 %

**27.** $V_{COMP}$ Determine percent concurrence with each strata using the table below
Tree = 100 % Shrub/Sapling = 50 % Ground Vegetation = ___ % . . . . Average 33.3 %

| Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands | | |
|---|---|---|
| Tree | Shrub/Sapling | Ground Vegetation |
| *Acer rubrum* | *Acer rubrum* | *Arundinaria gigantea* |
| *Betula nigra* | *Betula nigra* | *Aster* sp. |
| *Carya laciniosa* | *Carya laciniosa* | *Boehmaria cylindrica* |
| *Celtis laevigata* | *Carpinus caroliniana* | *Campsis radicans* |
| *Fraxinus pennsylvanica* | *Celtis laevigata* | *Carex squarosa* |
| *Liquidambar styraciflua* | *Celtis occidentalis* | *Eragrostis alba* |
| *Quercus pagodifolia* | *Fraxinus pennsylvanica* | *Glyceria striata* |
| *Quercus phellos* | *Ilex decidua* | *Hypericum* sp. |
| *Quercus lyrata* | *Liquidambar styraciflua* | *Impatiens capensis* |
| *Quercus imbricaria* | *Nyssa sylvatica* | *Panicum* sp. |
| *Quercus michauxii* | *Quercus imbricaria* | *Parthenocissus quinquefolia* |
| *Quercus stellata* | *Quercus lyrata* | *Pilea pumila* |
| *Quercus palustris* | *Quercus phellos* | *Quercus phellos* |
| *Salix nigra* | *Quercus palustris* | *Salix nigra* |
| | *Quercus pagodifolia* | *Sauraurus cernuus* |
| | *Quercus stellata* | *Smilacina racemosa* |
| | *Platanus occidentalis* | *Smilax rotundifolia* |
| | *Salix nigra* | *Sparganium* sp. |
| | *Ulmus americana* | *Toxicodendron radicans* |

1.61
50% = .805
20% = .322
* Red maple = 1.12
* Sweetgum = .47
Am. elm = .01
Shell Hickory = .01
1.61

38 → 50% = 19, 20% = 8
* Other = 8
Red maple = 5
Carya lac. = 2
* Ash = 17
Ilex = 1
Sweetgum = 2
Elm = 3
38

POISON IVY 2%
* ASTER SP. 5%
* CAREX SP. 5%
* CARDAMINE BULBOSA 3
15%

15
↓
50% = 8
20% = 3

***Basal Area - PLOT 11***

| dbh (in) | dbh (cm) | cm² | x .000079 |
|---|---|---|---|
| 6.8 | 17.272 | 298.322 | 0.024 |
| 4.9 | 12.446 | 154.903 | 0.012 |
| 27.0 | 68.580 | 4703.216 | 0.372 |
| 5.8 | 14.732 | 217.032 | 0.017 |
| 14.5 | 36.830 | 1356.449 | 0.107 |
| 14.6 | 37.084 | 1375.223 | 0.109 |
| 5.1 | 12.954 | 167.806 | 0.013 |
| 11.2 | 28.448 | 809.289 | 0.064 |
| 8.5 | 21.590 | 466.128 | 0.037 |
| 18.8 | 47.752 | 2280.254 | 0.180 |
| 20.3 | 51.562 | 2658.640 | 0.210 |
| 13.6 | 34.544 | 1193.288 | 0.094 |
| 4.0 | 10.160 | 103.226 | 0.008 |
| 5.7 | 14.478 | 209.612 | 0.017 |
| 5.8 | 14.732 | 217.032 | 0.017 |
| 10.4 | 26.416 | 697.805 | 0.055 |
| 23.2 | 58.928 | 3472.509 | 0.274 |
| | | **Total** | **1.610** |